

“I HAD A LOT MORE FAITH IN DOCTORS BACK THEN:” AN ANALYSIS OF CHRONIC
PAIN CONTENT IN ONTARIO MEDICAL CURRICULA

Leigha April Comer

A thesis submitted to the Faculty of Graduate Studies
in partial fulfillment of the requirements for the degree of

Master of Arts

Graduate Programme in Sociology

York University

Toronto, Ontario

October, 2016

© Leigha Comer, 2016

Abstract

This study is an assessment of pain content in three undergraduate medical curricula in Ontario. While chronic pain is a notoriously common condition affecting one in five Canadians, persistent pain remains undertreated and poorly understood. Physicians' failure to adequately manage patients' pain has been attributed, in part, to the lack of pain content in medical curricula. It is well-documented, for instance, that medical students receive very few hours of pain education, particularly in comparison to other health professions. While some work has been done to quantify the total amount of pain instruction medical students receive, the content itself has received little attention. There is also a paucity of information regarding what medical students learn about the pain theories, assumptions, beliefs, and medical models framing this content. This study examines the medical curricula at three undergraduate medical schools in Ontario in order to assess what, and how, students learn about pain.

Acknowledgments

I am indebted to many people who offered their support, advice, and guidance as I pursued this research. I would like to thank the wonderful people at Fibromyalgia-Chronic Fatigue Syndrome Canada, the moderators of the national support group Surviving Chronic Pain in Canada, and the staff at the Canadian Pain Society and the Canadian Pain Coalition. Your patience in answering my questions and pointing me to new avenues of research is greatly appreciated. Special thanks also to the faculty and administrative staff at the three medical schools I studied here. In sharing curricular resources, discussing objectives and content, and supporting my requests for access you made this thesis possible. I am also enormously grateful also to Pat Armstrong and Eric Mykhalovskiy, who formed a wonderfully supportive supervisory committee. Thank you also to Joel Katz for your insightful comments and for suggesting new avenues of investigation and sites for future research. Finally, a big “thank you” to my family: Subbu, Finley, Ian, mom, dad, athai, mama, and everyone else who has given their unwavering support over the past two years.

Table of Contents

Abstract	ii
Acknowledgments.....	iii
Chapter One: Introduction	1
Problematizing the Everyday World.....	4
Medical Education in Ontario	9
Research Design and Methods.....	10
Summary	18
Chapter Two: Review of the Literature	19
A Biopsychosocial Approach to Pain	21
Knowledge Translation in Clinical Practice	27
Summary	30
Chapter Three: Standards Regulating the Medical Curriculum.....	31
Standards and Objectives Shaping Medical Curricula in Canada	32
Entry-to-Practice Competency Requirements.....	34
The IASP Interprofessional Pain Curriculum	36
Summary	37
Chapter Four: The Organization of Pain Content in the Medical Curriculum	39
The Organization of Pain Education in North America.....	39
School One.....	42
School Two	44
School Three	45

Integrating Pain into the Curriculum: Lessons from the Literature	46
Summary	47
Chapter Five: Pain Mechanisms and Manifestation	49
A Brief History of Pain Theories	50
Mechanisms of Pain	52
Pain Mechanisms in the Curriculum: Where Are We Now?	55
Contradictions and Limitations	58
Summary	62
Chapter Six: Pain Management: Cuts, Chemicals, and Beyond	64
Putting Theory to the Test: Treating Pain	64
Pharmacology of Pain in the Medical Curriculum	67
Opioids, Opioids, and More Opioids	71
Discourse of Pain in the Curriculum	78
Summary	82
Chapter Seven: Biopsychosocial Content in the Curriculum	84
Pain Education from a Biopsychosocial Perspective	84
Palliative and End-of-Life Care	92
Summary	95
Chapter Eight: Developing a Pain Curriculum: Final Thoughts and Future Challenges	96
Developing an Undergraduate Pain Curriculum	97
Limitations	104
Conclusion	105
Bibliography	114

Chapter One: Introduction

“The merest schoolgirl when she falls in love has Shakespeare or Keats to speak her mind for her, but let a sufferer try to describe a pain in his head to a doctor and language at once runs dry.”

-Virginia Woolf, *On Being Ill* (1930)

Chronic pain is one of humankind’s oldest and most common afflictions, and yet it is also one of the least understood. While pain is a universal experience among sentient beings, it is also a remarkably private one. In her classic text *The Body in Pain*, Elaine Scarry describes the immense difficulty of conveying to others the quality and intensity of physical pain.¹ Pain is an experience of intense physical discomfort which often cannot be captured in words. Given the impact of pain and suffering on the individual, throughout history societies have attempted to make sense of the meaning of pain and of the reasons we suffer. Some religious traditions have understood physical pain as part of a larger plan, while contemporary societies tend to view pain as an “alarm” that signals the threat of tissue damage. Many traditions, past and current, also see pain as a means of glimpsing one’s humanity.² These various explanations demonstrate the significance of pain in shaping individual and cultural conceptions of the utility, and futility, of pain and suffering.

The International Association for the Study of Pain (IASP) defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.”³ This definition conceptualizes pain as a psychological state that most often has an identifiable physical cause. Today, pain is mostly thought of as an “alarm,” a warning from the body that something is amiss. As Melzack and Wall (1996) put it, the “link between pain

¹ Scarry, E. (1985). *The Body in Pain: The Making and Unmaking of the World*. Oxford: Oxford University Press.

² Kavanagh, K.H. (2007) “Meaning in Suffering: A Patchwork Remembering.” In N. Johnston and A. Scholler-Jaquis (Eds.), *Meaning in Suffering: Caring Practices in the Health Professions*. Wisconsin: University of Wisconsin Press, 7-59

³ Merskey, H. and Bogduk, N. (2011). *Classification of Chronic Pain: Descriptions of Chronic Pain Syndromes and Definitions of Pain Terms (Second Edition)*. Seattle: IASP Press.

and injury seems so obvious that it is widely believed that pain is always the result of physical damage and that the intensity of pain we feel is proportional to the severity of the injury.”⁴

However obvious this link between injury and pain may seem, it is much more variable and complex than a simple stimulus-reaction relationship. Injury may occur without pain, as in the case of people born with congenital analgesia. From birth, these people cannot perceive physical pain, often leading to an accumulation of wounds, bruises, and other health issues that go undetected. More commonly, people may experience episodic analgesia, where the pain of an injury is not felt until many minutes or hours afterwards. In a famous study by Beecher (1959), 66% of soldiers wounded in battle did not feel pain at the time of injury. Most of the soldiers denied having pain from serious wounds, or had so little pain that they did not want any medication.⁵ In a similar study by Melzack et al., the authors found that 37% of patients at an emergency clinic felt pain only minutes or hours after sustaining an injury.⁶

In contrast, it is also possible to feel pain without any detectable injury or tissue damage. This is the case in certain headache disorders, such as tension headaches or trigeminal neuralgia, in which the tissues and nerves are found to be healthy. In other cases, pain may persist once an initial injury has healed. Post-operative pain following surgery, post-herpetic neuralgia, and phantom limb pain persist long after tissue damage has healed.⁷ In these cases, the utility of pain as an “alarm” has long passed, and yet sufferers continue to live with significant, unresolved pain. When pain persists after the initial injury has healed, or without any observable tissue damage, it is classified as chronic. By definition, chronic pain is an unpleasant physical sensation that has lasted longer than six months, or beyond the expected time of healing.⁸

The variable link between pain and injury is described by Melzack and Wall as the “puzzle of pain.” They ask: “why are pain and injury not always related? What activities of the nervous

⁴ Melzack, R. and Wall, P.D. (1996). *The challenge of pain*. Harmondsworth: Penguin, 4

⁵ Beecher, H.K. (1959). *Measurement of subjective responses: quantitative effects of drugs*. New York: Oxford University Press.

⁶ Melzack, R., Wall, P.D., and Ty, T.C. (1982). “Acute Pain in an Emergency Clinic: Latency of Onset and Descriptor Patterns Related to Different Injuries.” *Pain* 14, 33-43

⁷ Henry, J.L. (2008). “The need for knowledge translation in chronic pain.” *Pain Research and Management* 13(6), 465-476

⁸ Morris, D.B. (2003). “The challenges of pain and suffering.” In T.S. Jensen, P.R. Wilson, and A.S.C. Rice (Eds.), *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press.

system intervene between injury and pain perception that make the relationship so variable?”⁹ It was once thought that the key to solving this puzzle was to map the pain mechanisms through which noxious stimuli produce impulses through the spinal cord and the brain. This concept of pain pathways originates from Descartes’ work in the seventeenth century and persists, to varying extents, today.¹⁰ While theories predicated on pain pathways and mind-body dualism might explain the phenomenon of acute pain, they fall short in explaining why pain persists after an initial injury has healed, or why pain often cannot be linked to tissue damage.

Given the scarcity of knowledge regarding pain mechanisms and the link between tissue damage and pain, diagnosing and treating chronic pain has proven to be incredibly frustrating for both doctors and patients. One reason for this trouble lies in the dominant medical model framing health care in most contemporary societies. This medical model operates on a curative basis, and grounds its approach in a biomedical perspective that views the body as a collection of parts to be fixed.¹¹ Under this model, medical professionals primarily treat illness by searching for a single physiological cause of pathology, with the expectation that curing this cause will resolve any symptoms. Unfortunately, this biomedical orientation has proved largely ineffective in treating chronic pain, as successful pain treatment requires taking into account the complex biological, psychological, and social factors that co-produce the experience of pain.¹² While biomedicine is an ineffective approach for treating complex conditions such as chronic pain, medicine continues to adhere to this model, and medical professionals are typically reluctant to consider innovative treatments for chronic pain.¹³

⁹ Melzack and Wall (1996), 4

¹⁰ Melzack, R. (1996). “Gate control theory: On the evolution of pain concepts.” *Pain Forum* 5(2): 126-138

¹¹ Armstrong, P. and Armstrong, H. (2010). *Wasting Away: the undermining of Canadian health care*. New York: Oxford University Press.

¹² Pridmore, S. (2002). *Managing chronic pain: a biopsychosocial approach*. London: Martin Dunitz.

¹³ Belgrade, M.J. (2003). “Alternative and Complementary Therapies.” In T.S. Jensen, P.R. Wilson, A.S.C. Rice (eds.) *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press.

This refusal to consider other models and treatment modalities has significant consequences. In Canada, one in five adults suffers from chronic pain.¹⁴ Pain is the most common reason for emergency department use, accounting for 78% of all emergency department visits.¹⁵ Chronic pain also presents a financial burden, as it is estimated that each year the health care expenses, lost income, and lost productivity associated with chronic pain cost over \$45 billion in Canada.¹⁶ Likewise, the consequences of chronic pain for the individual are considerable: chronic pain sufferers are two to three times more likely to commit suicide, and among major illnesses, chronic pain is the second cause of suicide in Canada after bipolar disorder.¹⁷ Uncontrolled pain compromises the immune system, promotes tumour growth, and increases morbidity and mortality following surgery.¹⁸ Finally, compared to other chronic diseases such as chronic lung and heart disease, people suffering from chronic pain experience the lowest quality of life.¹⁹ It is no surprise then that Kotarba (1983) described biomedical treatment of chronic pain as one of medicine's "greatest failures."²⁰

Problematizing the Everyday World

As someone who suffers from chronic pain, I began my research generally interested in the experiences of other people living with chronic pain. As I started thinking about how I would pursue this research, I was conflicted. On the one hand, I was interested in pursuing qualitative

¹⁴ Moulin, D.E., Clark, A.J., Speechley, M., and Morley-Forster, P.K. (2002). "Chronic pain in Canada—Prevalence, treatment, impact and the role of opioid analgesia." In *Pain Research and Management* 7(4): 179-184

¹⁵ Todd, K.H., Ducharme, J., et al. (2007). "Pain in the Emergency Department: Results of the Pain and Emergency Medicine Initiative (PEMI) Multicenter Study." In *The Journal of Pain* 8(6), 460-466

¹⁶ Henry, J.L. (2001). "Report of the Canadian Consortium on Pain Mechanisms Diagnosis and Management: Defining the Research Agenda for Pain in Canada." *Canadian Consortium on Pain Mechanisms Diagnosis and Management*.

¹⁷ Heshusius, L. (2009). *Inside chronic pain: an intimate and critical account*. Ithaca: Cornell University Press, 3

¹⁸ Liebeskind, J.C. (1991). "Pain can kill." *Pain* 44, 3-4

¹⁹ Choiniere, M., Dion, D., et al. (2010). "The Canadian STOP-PAIN Project Part 1: Who are the patients on the waitlists of multidisciplinary pain treatment facilities?" *Canadian Journal of Anesthesia* 57, 539-48

²⁰ Kotarba, J. (1983). *Chronic Pain: Its Social Dimensions*. London: Sage Publications, 14

research in which I could conduct in-depth interviews. On the other hand, I was also interested in how the health care system structures people's experiences of seeking care for their pain. In bringing together people's everyday experiences of chronic pain with an analysis of the institutional relations organizing this experience, institutional ethnography and the work of Dorothy Smith proved essential. For Smith (2002), one of the challenges facing traditional sociological inquiry is the objectification of individuals that results when people's experiences are understood or theorized in terms of the established categories of sociological discourse.²¹ The goal of institutional ethnography, then, is to re-arrange the social relations of knowledge such that we can make visible how we are connected into extended social relationships, which Smith terms "extra-local relations." Rather than start from a specific theoretical framework such as positivism or critical theory, institutional ethnography starts from the local standpoint of the individual, who is understood as the expert practitioner of their everyday world. The institutional ethnographer then locates the junctures where the individual's everyday world "hooks into" extra-local relations that connect beyond the scope of their individual experience.²² Like cartography, institutional ethnography maps social relations in such a way that we can move beyond the individual's perspective to learn how their experience is organized extra-locally.

In order to begin from the local standpoint of the individual's everyday world, I began my research by interviewing four people living with chronic pain. These interviews were conducted in a graduate methods course on empirical methods. In order to recruit participants, I posted a brief description of my research, including my contact information, to an online support group for people living with chronic pain, of which I am a member. The organization Fibromyalgia-Chronic Fatigue Syndrome Canada also published a brief article on my research, encouraging members to participate. I interviewed the first four people to contact me, all of whom live with some form of chronic pain. All four participants were women, ranging in age from twenty-one to thirty-five. One of the participants has experienced daily migraines since she was in elementary school; another has lived with costochondritis for over ten years; the third participant has suffered from

²¹ Smith, D.E. (2002). "Institutional Ethnography." In T. May (Ed.) *Qualitative Research in Action*. London: SAGE, 18

²² Smith, D. (2005). *Institutional ethnography: a sociology for people*. Walnut Creek, CA: AltaMira Press, 29

endometriosis since she was a young girl; and the fourth had been diagnosed with osteoarthritis as an adolescent, only to be recently diagnosed with fibromyalgia.

I conducted semi-structured, in-depth interviews, using a general topic guide based on topics of interest rather than a pre-determined list of questions. This guide consisted of a list of topics that I was interested in discussing with participants, including the impact of pain on one's quality of life and the everyday work required to manage chronic pain. In all four interviews, however, I made little use of the guide, as the majority of each interview was structured by participants in the telling of their narrative. At the beginning of each interview, I asked participants to start by explaining when they had first begun to feel pain, and to bring me through to today. Other than prompting participants by occasionally asking for clarification, I mostly allowed them to structure their narratives as they saw fit.

In all four interviews, participants began their account by describing not only the first sensation of physical discomfort, but also their experience of seeking a diagnosis from a doctor. Next, each participant moved on to list the numerous specialists they had seen, as well as pharmaceuticals they had been prescribed and, in two cases, surgical interventions they had undergone. At the end of each interview, participants revealed their frustrations with doctors, and speculated as to why doctors treat chronic pain in a way that they felt was ineffective. Rather than attempt to steer participants away from this trend, I started to wonder if they organized their narratives in this way because their overall experience of chronic pain has been organized by their encounters with doctors. I began to realize that the very way in which participants choose to structure and tell their stories of chronic pain allows insight into the social organization of their experiences.

In addition to structuring their narratives around their experiences with doctors, each of the participants was insistent in their belief that inexperienced doctors were at least partially responsible for the suffering they have experienced as a result of undertreated pain. Interestingly, when I asked about the severity of their pain and how physical discomfort affects their lives, most of the participants were very matter-of-fact about their pain, and often made light of their discomfort by joking and laughing. However, in describing their experiences with doctors who were incapable of treating their pain, unwilling to accept their pain as legitimate, or who prescribed ineffective or even dangerous treatments, participants demonstrated a great deal of frustration and

anger. One participant, Robyn,²³ asked repeatedly throughout the interview “why would a doctor think that’s okay?” in reference to an incorrect diagnosis she had been given several years prior. Amanda, a twenty-one-year-old with endometriosis, described her confusion and anxiety at having been advised by one specialist to undergo a hysterectomy, while another specialist insisted that hysterectomies do not cure endometriosis. Another participant, Jennifer, explained that she now takes notes of everything her doctor says, and compares these notes with what she has been told by other physicians and specialists. When I asked if this had always been her practice, she said that in the beginning she had mostly trusted what her doctors told her, noting: “I had a lot more faith in doctors back then.”

In attempting to make sense of their experiences with doctors, my participants speculated as to doctors’ motives and intentions. For instance, they suggested that perhaps doctors are opiofobic, or that they think chronic pain is “all in people’s heads” or due to hysteria. George Smith (1990) argues that these kinds of explanations preclude understanding how the world actually works.²⁴ The work of institutional ethnography, then, is to uncover empirically how the world *does* work. In the case of health care for chronic pain, once we have a concrete grasp on how this care is organized, we can begin to challenge and change the system’s internal workings. Speculative accounts regarding doctors’ intentions only get us so far in changing the health care chronic pain sufferers receive. In response to the question “why would a doctor think that’s okay?”, the work of institutional ethnography is to study the institutional framework in which health care for chronic pain is delivered.

In considering the extra-local relations organizing the health care chronic pain sufferers receive, I identified the pain management provided by doctors as a key “node” within this process. Rather than rely on speculative accounts of doctors’ intentions, I turned these assumptions into a question, asking myself: “why do doctors treat chronic pain the way they do?” In doing so, I began to realize that doctors are not simply born with knowledge regarding the body and pain. Instead, doctors learn about the body and medicine from an institution rooted in a particular social and historical context: in this case, medical programs organized by their respective curricula. By investigating what doctors learn about chronic pain throughout their medical education, and by asking whether this educational experience aligns with the theories of pain and the approaches

²³ All names used are pseudonyms.

²⁴ Smith, G. (1990). “Political Activist as Ethnographer.” *Social Problems* 37(4): 634

advocated by the pain literature, we can begin to make sense of why doctors treat chronic pain the way they do.

While chronic pain is notoriously undertreated in Canada, there are a number of treatment modalities that have been shown to reduce pain and improve quality of life. In recent years there have also been significant advancements in developing an interdisciplinary model to effectively treat chronic pain.²⁵ There is also evidence that specific approaches to chronic pain care, based on a biopsychosocial and chronic disease management model, can improve pain treatment outcomes.²⁶ Unfortunately, these new models and therapeutic modalities are infrequently adopted in clinical practice.²⁷ While these new treatment modalities and understandings of pain mechanisms allow for improved treatment of persistent pain, doctors continue to display a lack of knowledge about pain and pain management, while also demonstrating negative attitudes towards treating patients with chronic pain.²⁸ For instance, a Canadian survey found that due to doctors' opiophobia, major opioid analgesics are underutilized in the management of moderate to severe pain.²⁹

While there exist many explanations for the lag in translating pain theory into practice, this thesis focuses on the pain education undergraduate medical students receive, and on whether this education aligns with the biopsychosocial, interdisciplinary model recommended by the literature. I suggest that changes in the medical curriculum organizing students' education could bring about widespread improvements in the way doctors treat chronic pain, and greater adherence to recommended guidelines and treatment models. By studying what doctors learn about chronic pain, we can make practical changes based on sound empirical evidence, as opposed to speculation and assumptions. Examining curriculum content will also allow for an assessment of knowledge translation in undergraduate medical education, and whether new findings on chronic pain treatment are being translated into Ontario medical curricula. While improving doctors' pain

²⁵ Henry, J.L. (2008), 472

²⁶ Poyhia, R., Niemi-Murola, L., and Kalso, E. (2005). "The outcome of pain related undergraduate teaching in Finnish medical faculties." *Pain 115*, 234-237

²⁷ Henry, J.L. (2008), 472

²⁸ Weinstein, S.M., Laux, L.F., Thornby, J.I., Lorimer, R.J., Hill, C.S., Thorpe, D.M., and Merrill, J.M. (2000). "Physicians' attitudes toward pain and the use of opioid analgesics: results of a survey from the Texas Cancer Pain Initiative." *Southern Medical Journal 93*(5), 479-487

²⁹ Moulin, D.E., et al. (2002), 183

education will not entirely solve the “puzzle of pain,” research suggests that a well-designed pain curriculum can improve physicians’ ability to manage pain effectively.³⁰

Medical Education in Ontario

In Canada, most students begin medical school after finishing an undergraduate degree, usually in a field such as biological or physical sciences. Medical schools offer programs ranging from three to five years in duration, and upon completion, students are awarded a Doctor of Medicine (MD) degree. For most programs, the first two years of the curriculum are dedicated to pre-clerkship, in which students learn the fundamentals of medicine. Following this, students enter clerkship, in which they are required to rotate through various medical specialties and treat patients under physician supervision. Having completed an MD program, medical students move on to residency in a teaching hospital or clinic associated with a medical school. Upon finishing residency and passing the Medical Council of Canada Examinations, students are authorized to practice medicine independently and without supervision.³¹

There are six accredited medical education programs in Ontario: The Michael G. DeGroote School of Medicine at McMaster University, The Northern Ontario School of Medicine, The University of Ottawa Faculty of Medicine, The Queen’s University School of Medicine, The University of Toronto Faculty of Medicine, and The Schulich School of Medicine and Dentistry at Western University. This thesis examines the curricula of three medical schools in Ontario in order to identify the ways in which chronic pain content is integrated into these curricula. I am interested not only in the content of each curriculum, but also in the organization of this content and how this organization structures the totality of students’ pain education. In studying the curriculum, I also investigate the international and national standards regulating what medical graduates are expected to learn about pain management. I also compare the three curricula studied here in order to identify differences among the programs. In assessing each curriculum, I look to answer the following research questions:

³⁰ Niemi-Murola, L., Pirkko, H., Pyorala, E., Eija, K., and Reino, P. (2006). “Training medical students to manage a chronic pain patient: both knowledge and communication skills are needed.” *European Journal of Pain* 10, 167-170

³¹ “Becoming a Physician.” Health Force Ontario. www.healthforceontario.ca/en/Home/Students

- What international, national, and provincial standards regulate pain content in undergraduate medical curricula in Ontario?
- How is pain content organized in the medical curriculum?
- What do students learn about pain in undergraduate medical programs in Ontario?
- What underlying theories of pain, pain beliefs, and assumptions regarding the role of medicine and the body are integrated into the medical curriculum?

Research Design and Methods

In order to answer these research questions, I conducted a content analysis of various documents comprising the curricula of three undergraduate medical schools in Ontario. This work began by defining what we mean by “the curriculum,” and which texts mediate this curriculum. To do so, I conducted a literature review of some of the major curriculum studies texts, including Pacheco (2012),³² Fish and Coles (2005),³³ and Kelly (2009).³⁴ From curriculum studies, I adopt Kelly’s definition of the curriculum as “the totality of the experiences the pupil has as a result of the provision made.”³⁵ From Kelly’s work I also understand the curriculum as encompassing four dimensions: the intentions of planners, the procedures adopted to implement these intentions, the actual experiences of students as teachers attempt to carry out these intentions, and the “hidden” learning that occurs as a by-product of the organization of the curriculum.³⁶ Although the latter two dimensions are beyond the scope of this thesis, work done by Poyhia et al. (2005)³⁷ and Niemi-Murola et al. (2006) address these two dimensions of the pain curriculum.³⁸ While this thesis focuses exclusively on the formal, written curriculum, it does not encompass the hidden, informal

³² Pacheco, J.A. (2012). “Curriculum Studies: What is The Field Today?” *Journal of the American Association for the Advancement of Curriculum Studies* 8, 1-18

³³ Fish, D. and Coles, C. (2005). *Medical Education: Developing a curriculum for practice*. New York: Open University Press.

³⁴ Kelly, A.V. (2009). *The Curriculum: Theory and Practice (6th Edition)*. London: Sage.

³⁵ Kelly, A.V. (2009), 13

³⁶ *ibid.*

³⁷ Poyhia, R., Niemi-Murola, L., and Kalso, E. (2005), 234

³⁸ Niemi-Murola, L., Pirkko, H., Pyorala, E., Eija, K., and Reino, P. (2006). “Training medical students to manage a chronic pain patient: both knowledge and communication skills are needed.” *European Journal of Pain* 10, 167-170

curriculum, as these aspects of students' medical education is inaccessible through artefacts such as course descriptions and syllabi.³⁹

In order to ensure a representative sample of pain content in undergraduate medical curricula, I studied the curricula of three of the six medical schools in Ontario. In deciding which schools to include, I chose three programs demonstrating a variety in terms of size of the program, governance and structure, and curriculum design. In order to ensure anonymity, I will refer to the medical schools I studied as School One, School Two, and School Three. While I will briefly describe the organization of these undergraduate programs, and the ways in which pain content is mapped into each curriculum, I will do so in such a way that identifying features of each program will be kept at a minimum. As is the case with most medical schools in Canada, each program I studied shared essentially the same organizing format: years one and two are dedicated to pre-clerkship, while years three and four are clinical clerkship years that prepare students for transition to residency.

School One is the largest of the three medical programs studied here, and also the oldest. The program spans four years, divided into two years of pre-clerkship and two years of clerkship. The pre-clerkship curriculum, which includes the bulk of the program's pain content, is currently in the process of being revised and expanded. School Two is roughly half the size of School One, and is some years younger than School One. The curriculum at School Two is based on a spiral curriculum framework in which foundational materials are taught in the first two years, with more complex cases studied in the last two years of clerkship. School Three is the youngest and smallest of the three medical schools studied here. Its program also spans four years and is divided into three phases, starting with case-based module systems that cover foundational medicine, then moving onto clerkship and specialist clerkship rotations.

Having selected three medical schools to include in this study, I contacted each program in order to collect the information and curricular documents necessary. The experience of contacting each program varied widely, as protocols and standards differed not only between universities, but also within them. I began by e-mailing administrative staff at each program. I received no response from the staff at School One or School Two. An administrative manager from School Three

³⁹ Hafferty, F.W. and Castellani, B. (2009). "The hidden curriculum: a theory of medical education." In C. Brosnan and B.S. Turner (eds.) *Handbook of the Sociology of Education*. New York: Routledge, 15-35

eventually replied to my e-mail, and he attempted to put me in contact with a faculty member responsible for curriculum planning. Unfortunately, I did not hear back from that faculty member.

Having had little luck communicating with the medical programs through administrative staff, I renewed my efforts in two ways. First, I contacted academics studying chronic pain who are also affiliated in some way with the medical programs I was studying. This proved very fruitful, as these researchers provided me with many curricular documents and also assisted me in contacting curriculum planners. Second, rather than asking administrative staff to connect me with relevant faculty, I started to directly contact faculty myself. I did so by reading through program directories online, and contacting faculty associated with pain education, anaesthesiology, and curriculum planning. In order to gain access to curricular documents and information, I also contacted the deans of each medical program, which proved by far the quickest and easiest way of gaining access to information at School One and School Two (the dean from School Three did not respond to my e-mails or calls).

Each school, and each individual faculty member, held their own standards regarding access to information and ethics protocols. This considerably complicated my efforts as I had to manage several expectations at once, all while trying to uncover any sort of consistent standards I should abide by. For instance, the deans at School One and School Two requested a copy of my thesis proposal, as well as documents demonstrating that my proposal had been approved by the Faculty of Graduate Studies. Having received these documents, both deans were quick to approve my access to the necessary documents, and connected me with curriculum planners who could assist in answering my questions. Some faculty members, including those suggested by the deans, were hesitant to assist me. At School One, I met several times with a medicine lead of the pain curriculum. At first, this doctor was willing to answer my questions, and he insisted that I read certain articles and textbooks before providing me with the curricular documents I required. Having read the recommended texts, I had another meeting with him, at which point he said that the documents I required access to were confidential. Although the dean of that program had already granted me permission to access whatever documents necessary, this faculty member refused to provide access. Furthermore, although he had invited me to attend some of the interdisciplinary pain sessions organized by the program, he revoked the invitation, stating that I did not have the ethics approval necessary to sit in on these sessions. After contacting the

interfaculty committee responsible for organizing these sessions, I later learned that they were open to the public, and that I would have been welcome to attend.

I eventually accessed documents from School One in three ways. First, I came to find many of the syllabi, course descriptions, reading lists, and lecture notes online. I also found the student handbook online, which provides information regarding the organization and progression of the curriculum. Second, while meeting with a faculty member at the university, I was introduced to a second year medical school student. This student e-mailed me all of the lecture slides and reading lists from each pain session. Third, by contacting pain researchers affiliated with School One, they provided me with many of the lecture slides, notes, and reading lists that the medicine lead had originally denied me. These faculty members also assisted with brainstorming ways of accessing the documents at other universities, often by providing the contact information of faculty affiliated with other programs. In doing so, these faculty members facilitated my access to extended networks of pain researchers and curriculum planners.

Having learned from my mistakes in attempting to gain access to documents at School One, I began my research on School Two by contacting directly a medical doctor who specializes in chronic pain and who is affiliated with the medical program at School Two. This doctor provided me with the documents comprising the guest lecture she gives on chronic pain at School Two, and she also put me in contact with the anaesthesiologists who teach the acute pain sessions and who provided me with the content of their lectures. Finally, the dean of School Two approved my access to curricular documents, and connected me with the associate dean. In turn, the associate dean asked an educational developer to assist me in answering my research questions by providing the curricular documents I had requested. Beyond this assistance, I was also able to find a student handbook, course descriptions, and reading lists on the program website.

The faculty at School Three were by far the most eager to assist with my project, offering to connect me with other curriculum planners, forwarding helpful documents that I had not originally requested, and regularly asking for updates regarding my findings. The medical program at School Three is currently in the process of looking into developing a comprehensive pain curriculum, and they expressed interest in the utility of my research as an aid in planning such a curriculum. When I contacted the doctor who teaches the primary pain session at School Three, he was very eager to provide the information and documents I had requested. He also forwarded our communications to a number of other faculty members, including the chief of anaesthesia and

other curriculum planners. From these e-mails emerged a very productive conversation in which I was provided a wide variety of curriculum documents, including the contents of pain lectures as well as a schedule of the total pain objectives in the undergraduate medical curriculum. As with the other two programs, I was also able to find information and relevant texts online, including a student handbook, an overview of the undergraduate curriculum, and detailed course descriptions.

While I have described here the ways in which I procured the information and documents I required, it is important to note that the majority of my requests and attempts were unsuccessful. For the most part, my e-mails and calls went unanswered. On several occasions deans or faculty members forwarded my e-mails to curriculum planners who did not respond to subsequent e-mails or phone calls. There were also instances where faculty members refused my requests for access to documents and information, requesting additional ethics documents without describing what sort of ethics protocols, exactly, they expected me to procure, as I was not studying human subjects and my proposal had already been approved by the Faculty of Graduate Studies. Occasionally these doctors and researchers told me that they would request permission from the head of their department, only to ignore subsequent e-mails and telephone calls. Other times they would directly refuse my requests.

This lack of cooperation among medical schools may be due, in part, to concerns over how the information provided would be used, but also the critical lens through which I intended to conduct the content analysis. I was very upfront in explaining that I was particularly interested in the medical models framing the curriculum, and whether curricular content on pain aligns with recommendations made by the IASP and the chronic pain literature. As I was unwilling to deceive informants regarding my intentions and my research questions, I continued to be frank about my research despite the difficulty this caused in accessing the documents I needed. Hesitation on the part of faculty and curriculum planners might also have been due to the recent scrutiny of pain education in the media. News stories on pain content in the curriculum, and in particular, what

medical students are taught regarding opioid analgesics, have been published by the Council of Canadians,⁴⁰ Global News,⁴¹ and The Globe and Mail,⁴² among others.

As I have mentioned, standards regarding access to information, confidentiality, and interest in the project varied widely not only between programs, but also within medical schools and among faculty. This was the case, for instance, at a medical school I had been interested in studying, but ultimately could not include in this thesis due to a lack of access to any sort of documents or information. I read online that this program's undergraduate curriculum committee would, upon request, make meeting minutes available to the public. I searched through all of the available publications and the entirety of the website, as well as the program directory, and I could not find any contact information to request the meeting minutes. When I called the program office, they seemed surprised at my request, unsure of why a Master's student from a different university was seeking this information. After assuring me that they would look into it and get back to me, I never heard back.

Meanwhile, School Two's online committee mandate states that meeting minutes will be made available online, and yet I was unable to find any such minutes. School One and School Three publish terms of reference describing the role of their curriculum committees, and these terms state that meeting minutes are to be circulated to members, without mentioning whether meeting minutes are available to the public, or how to access these minutes. Given that all three of these programs are publicly funded, it is concerning that information regarding curricular content and decision making is so difficult to procure. Even when faculty were willing to provide me with the documents I needed, it could take several weeks to receive approval from deans and assistant deans to release information such as course objectives and the reading lists for lectures. Faculty and staff seemed equally unsure as to whether this information was confidential.

⁴⁰ Butler, M. (May 16 2016). "Who is behind Canada's opioid epidemic?" *The Council of Canadians*. <http://canadians.org/blog/who-behind-canadas-opioid-epidemic>

⁴¹ Tryon, J. and Tucker, E. (June 11 2013). "Patient safety may have been put at risk by U of T pain lectures: doctor." *Global News*. <http://globalnews.ca/news/633687/patient-safety-may-have-been-put-at-risk-by-u-of-t-pain-lectures-doctor/>

⁴² Weeks, C. (March 10 2016). "College of Family Physicians rejects call for mandatory course on safe opioid prescribing." *The Globe and Mail*. <http://www.theglobeandmail.com/life/health-and-fitness/health/college-of-family-physicians-rejects-call-for-mandatory-course-on-safe-opioid-prescribing/article29141141/>

Despite these setbacks, I did eventually collect the necessary data to conduct a thorough content analysis of each medical curriculum. I based my investigation on Krippendorff's definition of content analysis as "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use."⁴³ Guided by this definition, I conducted the content analysis in such a way that I did not simply read the texts and share my interpretations of their meaning, but did so in a way that made explicit what I was doing, thereby ensuring that these results are reliable and valid. Rather than simply state, for instance, "the curriculum at School Two focuses mostly on opioids," I include excerpts from curricular documents demonstrating this claim. I also emphasize the context of pain content by describing the sessions in which content is taught, while also linking this content to the organization of pain objectives in the curriculum as a whole.

I began the content analysis by outlining a framework of the overall curriculum, such that I could contextualize the content itself within the total educational experience. This involved reading student handbooks and documents that describe the structure of each program's curriculum. Having done so, my next step was to identify all instances in the curriculum where pain content is mentioned, whether this content is included in pain-specific courses or general required courses. Schools Two and Three assisted me in this process by providing a schedule of the total pain objectives in the curriculum. For School One, I had to go through the curriculum myself in order to find this information. Each program also provided me with the lecture slides, objectives, and reading lists of any sessions or lecture focused specifically on pain content.

Once I had accumulated a list of the pain content and total pain objectives at each program, I proceeded to identify major themes in each curriculum. In doing so, I identified topics most frequently covered in pain content and pain specific courses. These three themes are: pain mechanisms and manifestation, pharmacology of pain, and opioids and addiction. Content related to these themes constitutes the bulk of pain content at each medical school. In terms of pain mechanisms and manifestation, I found that each curriculum teaches pain mechanisms through the gate control theory. The integration of gate control theory in the curriculum is a positive step forward in contrast to earlier findings that the medical curricula persisted in teaching specificity

⁴³ Krippendorff, K. (2004). *Content analysis: an introduction to its methodology*. Thousand Oaks, California: Sage, 18

theory despite significant criticism from the 1960s onwards.⁴⁴ However, in my analysis of this content I found that the gate control theory is largely made to fit within a biomedical model, as certain aspects of the theory that align with biomedicine are emphasized in the curricula (e.g. neuroanatomy of pain) while other key features of the theory are excluded, such as the impact of psychosocial determinants on the manifestation of pain.

Identifying major themes in the three curricula studied here also allowed me to identify which topics and issues are *not* covered in the curricula. For instance, I found that content related to pain management is almost exclusively restricted to a discussion of pharmaceuticals and, in particular, opioid analgesics. In addition to identifying the preponderance of content on pharmaceuticals, I also assessed the ways in which this content is framed in the curriculum. Given that chronic pain, and the use of opioids for persistent pain, is heavily stigmatized, I was interested in how chronic pain and pain management are discussed within the curriculum. In analyzing this “discourse of pain,” I found that pain patients are described as “difficult” and “overwhelming” in the curriculum, and that lectures and case-based sessions make a clear distinction between “good” and “bad” pain patients. Furthermore, I also found that in case studies, female patients are described as suffering from chronic pain, often with psychological co-morbidities, while male patients are typically described as suffering from acute pain or cancer pain. I also noted that content on opioid use for chronic pain is frequently framed in the language of addiction, deviancy and aberrant behaviour.

In terms of biopsychosocial approaches and therapeutic modalities for diagnosing and managing chronic pain, I found that these approaches are largely excluded from each curriculum. When complementary or alternative therapies are mentioned, there is no explanation of when and why they are effective, or when to refer patients for these treatments. I also found that psychosocial determinants of health, which play a key role in the onset, duration, and perception of chronic pain, are largely absent from the curricula. When these psychosocial aspects of pain are discussed, it is typically within the context of a session on palliative and end-of-life care. At all three schools, the bulk of content related to alternative therapeutic modalities, the concept of “total pain,” and the discussion of pain as suffering is taught during sessions on palliative care. Given the success of these palliative sessions at providing a holistic, biopsychosocial pain education, I suggest that this

⁴⁴ Kotarba, J. (1983), 31

curriculum might be expanded beyond end-of-life care, to include chronic pain and unrelieved suffering at all stages of life.

Summary

In this chapter, I began by introducing the concept of pain and the philosophical, clinical, and social challenges we must grapple with in learning to manage chronic pain. Next, I described my use of institutional ethnography and the work of Dorothy Smith as a methodology by which I began to trace the extra-local relations organizing individuals' experiences of living with chronic pain and seeking health care for their pain. In doing so, I analyzed interview transcripts and identified doctors as key agents in the organization of people's experiences of chronic pain. In this way I recognized the junctures at which chronic pain patients' and doctors' everyday worlds "hook into" one another. Next, by mapping the extra-local relations organizing doctors' everyday worlds, I identified medical curricula as texts mediating the pain education medical students receive throughout an undergraduate medical program. My goal here was to describe the ways in which I started with people's narratives of their everyday experiences of chronic pain, and traced this local actuality to doctors' everyday worlds and the pain education that informs their pain beliefs and knowledge of pain management.

Next, I moved on to describe the overall organization of medical education in Canada, as well as the three medical schools I have chosen to study here. Having presented my research questions, I proceeded to detail the research design and the methods I employ. In order to assess the state of chronic pain content in Ontario medical curricula, I focus not only the content itself, but also the regulatory and institutional context in which this content is developed, as well as the underlying pain beliefs and intentions framing the pain curricula at each school. I finished by describing how I gathered the information required to complete this study, as well as some of my key findings. In the next chapter, I will provide a review of the literature, touching on the history of clinical research on pain as well as the development of pain theories over time. I will also introduce the biopsychosocial approach to chronic pain, and discuss the importance of this approach in chronic pain management.

Chapter Two: Review of the Literature

Despite the significant work that has been done in attempting to produce a comprehensive theory of pain, chronic pain remains a clinical and academic challenge for several reasons. First, pain and suffering are resistant to definition, as the English word “pain” refers to an endless number of different experiences that correspond to innumerable biological processes. The experience of pain is also mediated by variations in social background and personal history, such as social beliefs about pain and cultural meanings attached to suffering.⁴⁵ Finally, determining the cause of persistent pain and appropriate treatments is rarely straightforward. There are cases, for instance, when the cause of pain is apparent but available treatment is inadequate, as in the case of deep tissue disorders and peripheral nerve disorders. There are also cases where the cause of pain is not known but effective treatments are available, as with trigeminal neuralgia. Most difficult are instances where the cause of pain is unknown and there are no effective treatments available, as in the case of fibromyalgia, migraine, and idiopathic pelvic and abdominal pains.⁴⁶

These challenges highlight our ignorance of pain mechanisms, manifestation and effective therapies. While a better understanding of pain mechanisms is expected to lead to improved treatment outcomes, tracing these mechanisms remains difficult. Numerous theories have been proposed to explain our perception and experience of pain, with the hope that an accurate theory of pain would allow for the development of more effective treatments. Two such pain theories emerged in 1894, when von Frey published the specificity theory of pain and Goldscheider proposed the pattern theory of pain.⁴⁷ While specificity theory assumes the existence of specific pain receptors that transmit signals to a pain center in the brain, Goldscheider argued that the brain receives pain messages when stimuli combine to produce a pattern or combination of pain signals. These competing theories of pain claimed both detractors and supporters, though ultimately specificity theory came to dominate medical thought and practice. This is due largely to the fact that specificity theory is conducive to the orthodox biomedical emphasis on surgical intervention in disease, as well as to the biomedical practice of searching for one cause for one symptom.

Specificity theory dominated medical literature and clinical practice until 1965, when

⁴⁵ Morris (2003), 7

⁴⁶ Melzack and Wall (1996), 288

⁴⁷ Kotarba (1983), 29

Melzack and Wall proposed the gate control theory of pain in an article published in *Science*.⁴⁸ Subsequent research and expansion on the theory led to the publication of their seminal text, *The challenge of pain*, in 1982. In these texts the authors attempt to bridge the gap between pattern theory and specificity theory by recognizing the experimental evidence supporting both theories.⁴⁹ Melzack and Wall accept that there are nociceptors (pain fibres) and touch fibres, and they suggest that these fibres synapse in two different regions in the dorsal horn of the spinal cord. The cells produced by stimulation are then transmitted to three regions within the spinal cord, one of which, the substantia gelatinosa in the dorsal horn, acts as a gate that modulates the transmission of sensory information to transmission cells in the spinal cord. This gate is controlled by activity in the large and small fibres, whereby large-fibre activity closes the gate, and small-fibre activity opens the gate. When nociceptive information exceeds the threshold of inhibition, it opens the gate and activates the pathways that cause the individual to experience pain.⁵⁰

While the gate control theory provides a neural basis for the experience of pain, as well as a physiological explanation for the role of psychosocial factors in this process, there are certain phenomena that the theory does not adequately explain. There are, for instance, oversimplifications and flaws in Melzack and Wall's model of the neural structure of the spinal cord, as well as their hypothesized modulatory system.⁵¹ Nonetheless, the gate control theory of pain revolutionized pain research, opening new possibilities for understanding the persistence of pain after tissue damage has healed. If, due to various biological, psychological, and social factors, the spinal transmission gate is stuck open, sufferers can experience pain years after an injury has healed. Such is the case when sufferers experience psychological distress, such as depression and anxiety, as well as social problems such as unemployment, marital and family dysfunction, and substance abuse.⁵²

In accounting for the importance of psychosocial factors in individuals' perception of pain, the gate control theory encourages researchers to move beyond the heavy emphasis placed in the

⁴⁸ Melzack, R. and Wall, P. (1965). "Pain mechanisms: a new theory." *Science* 150(3699): 971-9

⁴⁹ Melzack and Wall (1996), 98

⁵⁰ Moayed, M. and Davis, K.D. (2012). "Theories of pain: from specificity to gate control." *Journal of Neurophysiology* 109(1), 5-12

⁵¹ *ibid.*, 9

⁵² Jacob, M.C and Kerns, R.D. (2001). "Assessment of the Psychosocial Context of the Experience of Chronic Pain." In Turk, D.C. and Melzack, R. (eds.) *Handbook of Pain Assessment* (2nd Edition). New York: The Guilford Press.

literature on differentiating psychogenic (psychological) from organic (physiological) pain.⁵³ As Melzack and Wall put it, “The evidence...shows unequivocally that psychological factors play an important role in pain perception and response. Suggestion, distraction, the meaning of the situation and the feeling of control are all capable of exerting a powerful influence on pain.”⁵⁴ The gate control theory also demonstrates that simple measures of pain intensity are inadequate, as pain is not exclusively a sensory experience. In some cases, psychological factors may come to play an even greater role in the experience of pain than noxious stimuli.⁵⁵ Managing chronic pain therefore requires an approach that considers the biological, psychological, and social factors involved in the experience of pain.

A Biopsychosocial Approach to Pain

As psychosocial factors came to be understood as influencing perceptions of pain, the social sciences took up chronic pain as an important question in the sociology of health and illness. Early studies focused on functionalist analyses of chronic pain, largely based on Parsons’ theory of the sick role and societal responses to illness.⁵⁶ Such studies include Kassebaum and Baumann’s (1965) study of sick role expectations of the chronically ill,⁵⁷ and Baszanger’s (1989) work on the importance for chronic pain sufferers to establish credibility with medical professionals.⁵⁸ Throughout the 1960s and into the 1990s, work on chronic pain and chronic illness tended to focus on two major axes: the relationship between chronic pain and medical workers, and patients’ experiences of chronic pain. Symbolic interactionism has become another popular lens through which to study chronic pain; studies in this tradition include research on patients’ efforts to manage

⁵³ Kotarba (1983), 44

⁵⁴ Melzack and Wall (1996), 244

⁵⁵ Turk, D.C. and Melzack, R. (2001). “The Measurement of Pain and the Assessment of People Experiencing Pain.” In Turk, D.C. and Melzack, R.M. (eds.) *Handbook of Pain Assessment (2nd Edition)*. New York: The Guilford Press.

⁵⁶ Kotarba (1983), 187-9

⁵⁷ Kassebaum, G. and Baumann, B. (1965). “Dimensions of the sick role in chronic illness.” *Journal of Health and Social Behavior* 6, 16-27

⁵⁸ Baszanger, I. (1989). “Pain: Its Experience and Treatments.” *Social Science and Medicine* 29(3), 425-434

stigma,⁵⁹ and the work people do to maintain a coherent sense of self in the face of chronic pain.⁶⁰

More recently, phenomenological studies of chronic pain have considered individuals' everyday experiences of chronic pain, and the meanings they attach to their pain. Such studies often utilize "pain narratives" that allow a voice to chronic pain sufferers and privilege sufferers' understanding of their pain.⁶¹ Other authors have written autobiographies detailing their experiences of living with chronic pain and chronic illness, including Heshusius' (2009) *Inside chronic pain: an intimate and critical account* and Frank's (1995) *The Wounded Storyteller: body, illness, and ethics*. These narratives allow for a more intimate understanding of the personal experience of living with persistent pain, as in the case of Koenig's (2003) description of patients' attempts to overcome chronic pain through behavioural changes, spiritual approaches, and various biomedical and alternative treatments.⁶²

Increasingly, research on chronic pain has shifted to constructing what Fry et al. (1997) refer to as a "profile" of the person in pain.⁶³ Some work has been done in attempt to differentiate "organic" pain sufferers from "non-organic" sufferers, in order to understand what separates those whose pain can be linked to tissue damage from those whose pain does not seem to have any physiological basis. The introduction of medical technologies such as the laparoscope has proven particularly important as researchers gain further access into the body, allowing them to search for signs of tissue damage that may have been previously undetectable. The quest to develop a profile of the person in pain has also been taken up in the field of psychology, as psychologists attempt to understand the role of childhood abuse in perceptions of chronic pain,⁶⁴ the importance of family

⁵⁹ Lennon, M.C., Link, B.G., Marbach, J.J., and Dohrenwend, B.P. (1989). "The Stigma of Chronic Facial Pain and Its Impact on Social Relationships." *Social Problems* 36(2): 117-134

⁶⁰ Roberto, K.A. and Reynolds, S.G. (2002). "Older Women's Experiences with Chronic Pain: Daily Challenges and Self-Care Practices." *Journal of Women & Aging* 14(3/4), 5-23

⁶¹ Richardson, J.C. (2005). "Establishing the (extra)ordinary in chronic widespread pain." *health: An Interdisciplinary Journal for the Study of Health, Illness and Medicine* 9(1): 31-48

⁶² Koenig, H.G. (2003) *Chronic Pain: Biomedical and Spiritual Approaches*. New York: The Haworth Pastoral Press.

⁶³ Fry, R.P.W., Crisp, A.H., and Beard, R.W. (1997). "Sociopsychological Factors in Women With Chronic Pelvic Pain With and Without Pelvic Venous Congestion." *Journal of Psychosomatic Research* 42(1): 71-85

⁶⁴ Humphreys, J., Cooper, B.A., and Miaskowski, C. (2011). "Occurrence, Characteristics, and Impact of Chronic Pain in Formerly Abused Women." *Violence Against Women* 17(10): 1327-1343

support in managing chronic pain,⁶⁵ and whether encouraging “protective” psychological behaviours can relieve pain.⁶⁶

In recent years, researchers have emphasized the importance of a “biopsychosocial” approach to pain, in which biological/medical, psychological/psychiatric, and social/environmental factors are understood as contributing to the etiology and experience of pain.⁶⁷ While the biopsychosocial approach to treating pain has been the recommended guideline in psychiatry and family medicine for more than two decades, clinical medicine continues to insist on separating psychological and physiological pain, while focusing almost solely on biological determinants of health.⁶⁸ Although orthodox medicine continues to privilege biological determinants of health in the onset and perception of pain, studies have found that biopsychosocial treatments such as cognitive-behaviour therapy,⁶⁹ group and individual counselling,⁷⁰ and chronic pain management programs⁷¹ have been effective in treating chronic pain and improving individuals’ overall quality of life.

The biopsychosocial model was initially developed by John Romano and George Engel at the University of Rochester in the 1970s.⁷² As a medical student, George Engel held a strong biomedical orientation, focusing most of his research on physiological causes of illness and

⁶⁵ Richardson, J.C., Ong, B.N., and Sim, J. (2007). “Experiencing chronic widespread pain in a family context: giving and receiving practical and emotional support.” *Sociology of Health and Illness* 29(3): 347-365

⁶⁶ Cano-Garcia, F.J., Rodriguez-Franco, L., and Lopez-Jimenez, A.M. (2013). “Locus of control patterns in headaches and chronic pain.” *Pain Research and Management* 18(4): 48-54

⁶⁷ Pridmore (2002), 3

⁶⁸ Cheville, A., Caaceni, A., and Portney, R. (2000). “Pain: definition and assessment.” In Massie, M.J. (ed.). *Pain: What Psychiatrists Need to Know*. Washington: American Psychiatric Press.

⁶⁹ Eccleston, C., Williams, A., and Morley, S. (2003). “Cognitive-behavior therapy for chronic pain in adults.” In Jensen, T.S., Wilson, P.R. and Rice, A.S.C. (eds). *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press.

⁷⁰ Altman, C.G. (2010). *The Role of Resilience in Adjustment to Chronic Pain: A Preventive Model for At-Risk Populations*. PhD Thesis. The Adler School of Professional Psychology: Chicago.

⁷¹ Kennett, D.J., O’Hagan, F.T. and Cezer, D. (2008). “Learned Resourcefulness and the Long-Term Benefits of a Chronic Pain Management Program.” *Journal of Mixed Methods Research* 2(4): 317-339

⁷² Morse, D.S., Johnson, K.R. and Cohen, J. (2013). *The Evolution and Legacy of the Engel and Romano Work in Biopsychosocial Medicine*. Rochester: Meliora Press.

dismissing psychology as “laughable...hogwash.”⁷³ This biomedical perspective of pain was (and remains) the dominant medical model in most contemporary health care systems. As a system of health care, biomedicine is based on treatments that penetrate the body “physically by surgery and chemically by drugs.”⁷⁴ From this perspective, the determinants of illness are understood as primarily biological, and the goal of medicine is to cure patients back to “normal.”⁷⁵ Of significance for the treatment of chronic pain is the biomedical assumption that the body operates like a machine, which Armstrong and Armstrong (2010), among others, term “the engineering model of the body.”⁷⁶ Within this framework, the body is seen as a collection of parts to be fixed, such that doctors and hospital units specialize in treating a specific section of the body.

Another defining aspect of biomedicine is the taken-for-granted assumption that medical doctors are the experts and authorities of medicine and the body.⁷⁷ The education doctors receive stresses the “biological and physical sciences upon which drug therapy and surgery are based,” and they are educated in “scientifically established procedures, applied to largely physiologically determined problems.”⁷⁸ Doctors gain their authority from the presumption that they hold objective, evidence-based knowledge regarding the body and medicine. Based on this authority, doctors have become the gatekeepers of biomedical health care, as is the case in Canada and elsewhere.⁷⁹ In this position of power, doctors control patients’ access to the health care system, and they often make the final decision in terms of diagnosis and course of treatment.

Engel was no different than the majority of doctors in his belief in the biomedical model and rejection of other approaches. This commitment was unwavering until he arrived at Harvard’s Peter Bent Brigham Hospital, where he was encouraged by the department chair to accompany a psychiatrist, John Romano, on rounds. Engel observed Romano as he conversed with each patient at their bedside, asking about their personal story instead of focusing solely on biological factors.⁸⁰

⁷³ Brown, T.M (2010). “The Historical and Conceptual Foundations of the Rochester Biopsychosocial Model.” *UR Research at the University of Rochester: History Faculty Unpublished Papers and Lectures*. <http://hdl.handle.net/1802/2781>

⁷⁴ Willis, E. (1983). *Medical dominance: the division of labour in Australian health care*. Sydney: Allen & Unwin, 2

⁷⁵ Armstrong and Armstrong (2010), 19-20

⁷⁶ *ibid.*

⁷⁷ *ibid.*, 21

⁷⁸ *ibid.*, 21-22

⁷⁹ *ibid.*, 26

⁸⁰ Morse et al. (2013), 2

Engel was impressed by the power of the in-depth interview and the importance of psychosocial information, later writing, “I saw the attending, John Romano, a young psychiatrist, pull up a chair, and sit down with the patient and, in effect, invite him to tell his own story before the assembled group...[this] changed my life forever. My entire career can be traced to that happy concordance of vision and action.”⁸¹

When Romano was later appointed chair of psychiatry at the University of Cincinnati, he invited Engel to join him there. At Cincinnati they continued their work on delirium and the importance of psychological factors in health and illness, incorporating this knowledge into the school’s teaching program.⁸² Although some senior faculty members shared their interest in the impacts of psychosocial variables on disease, many others were resistant. As such, George Whipple, the dean of the University of Rochester’s medical school, invited Romano to join the program as the founding chair of Rochester’s Department of Psychiatry. Once again, Romano invited Engel to join him, and at Rochester they started to work on integrating psychosocial knowledge into the medical curriculum.⁸³ The concepts developed in these courses, as well as the research conducted by both doctors along with their peers, provided the foundation of the biopsychosocial model.

Engel first introduced the term “biopsychosocial” in an article published in *Science* in 1977. In this seminal text he takes the biomedical model to task, arguing that biomedicine has become a dogma that requires that “discrepant data be forced to fit the model or be excluded.”⁸⁴ In describing the development of biomedicine in the West, Engel refers to Rasmussen’s argument regarding the Christian Church’s concession of allowing the dissection of human cadavers in the fifteenth century. Theologically, the Church felt that the body was a mere vessel for the soul, and therefore allowed for its dissection. However, given that the soul was understood as a matter of religion, scientists were forbid from “dissecting” the mind. In this way, the body came to be separated from the mind (or the soul) in scientific inquiry, and scientists studied the inner workings of the body with little understanding of the mind. These early explorations of the body focused

⁸¹ Engel, G.L. (1996). “From Biomedical to Biopsychosocial: II. A Personal Odyssey.” *Families, Systems, & Health* 14(4), 434-449

⁸² Morse et al. (2013), 2-3

⁸³ *ibid.*, 5

⁸⁴ Engel, G.L. (1977). “The need for a new medical model: a challenge for biomedicine.” *Science* 196(4286), 130

solely on what were understood as the mechanisms of a machine, with disease constituting the breakdown of such mechanisms.⁸⁵

Engel argues that in scientific investigation, it is acceptable to exclude phenomena from inquiry when the concepts and methods necessary to understand them have yet to be developed. In doing so, biomedicine proved successful beyond all expectation. However, by bracketing psychosocial processes and determinants of health and illness, strict adherence to biomedicine limits the ability to treat many complex, chronic illnesses. In contrast to this model, Engel suggests the adoption of a biopsychosocial model of medicine, in which the biological, psychological, and social determinants of health are seen as equally producing disease.⁸⁶ A biopsychosocial model also allows for the distinction between illness and “problems of living,” as in the case of chronic pain. For some people, pain is a mild irritant that goes away with time or treatment. For others, pain may persist after the wound has healed, shifting from a problem of living into a disease requiring comprehensive treatment.

The integration of a biopsychosocial model in the University of Rochester’s medical curriculum yielded significant improvements in graduates’ ability to interview patients and assess patients’ history and life circumstances.⁸⁷ Since then, the biopsychosocial model has been taken up by numerous scholars as a means of better addressing complex diseases such as diabetes, heart disease, irritable bowel syndrome, and chronic pain.⁸⁸ Pridmore (2002), for instance, describes the biopsychosocial model of illness as the “ideal recommended approach in all forms of pain.”⁸⁹ Gatchel et al. (2007) praise the biopsychosocial model as “the most heuristic perspective to the understanding and treatment of chronic pain.”⁹⁰ They praise this approach for distinguishing between disease and illness and for allowing for an understanding of pain as not merely a physiological experience but also a psychosocial one.

While researchers have critiqued the prevalence of biomedical treatments for chronic pain, I have found in the literature very little discussion of *why* clinical practice continues to privilege

⁸⁵ *ibid.*, 320-1

⁸⁶ *ibid.*, 324

⁸⁷ Morse et al. (2013), 29

⁸⁸ White, P. (2005). *Biopsychosocial Medicine: an integrated approach to understanding illness*. London: Oxford University Press.

⁸⁹ Pridmore (2002), 3

⁹⁰ Gatchel, R., et al. (2007). “The Biopsychosocial Approach to Chronic Pain: Scientific Advances and Future Directions.” *Psychological Bulletin* 133(4), 607

specificity theory and biomedical interventions, when the success of the biopsychosocial model in pain management is well-documented. Critiques of treating chronic pain from a biomedical approach abound: for instance, Kotarba (1983) describes the treatment of chronic pain as one of biomedicine's "greatest failures,"⁹¹ while Pridmore argues that unquestioning devotion to the biomedical model is not only ineffective in treating chronic pain, but potentially harmful.⁹² Engel addressed the origins and persistence of the biomedical model in an article published in 1977, criticizing medical schools in particular for constituting "unreceptive if not hostile environments for those interested in psychosomatic research and teaching."⁹³ He attributes this resistance, in part, on the medical establishment's determination to preserve its social power, as opposed to pursuing objective knowledge.⁹⁴

Knowledge Translation in Clinical Practice

While Armstrong and Armstrong question doctors' undisputed authority in making health care decisions, they do not argue that doctors should be stripped of all their power, or that doctors are not essential in preventing and treating illness. Instead, they conclude that we need to maintain a tension between recognizing doctors' expertise and questioning their nearly unlimited power in making health care decisions. Similar arguments have been made by scholars such as Oguamanam (2006)⁹⁵ and Cronje and Fullan (2003),⁹⁶ who advocate for the importance of questioning claims that doctors' knowledge is objective or neutral. The medical knowledge doctors receive is historically contingent, and this knowledge is often debated and contested. The validity of medical knowledge is generally established by institutions such as medical schools, which organize and structure medical curricula based on the acceptance of certain kinds of knowledge as factual and

⁹¹ Kotarba (1983), 13

⁹² Pridmore (2002), 28

⁹³ Engel (1977), 327

⁹⁴ *ibid.*, 329

⁹⁵ Oguamanam, C. (2006). "Biomedical Orthodoxy and Complementary and Alternative Medicine: Ethical Challenges of Integrating Medical Cultures." *Journal of Alternative and Complementary Medicine* 12(5): 577-581

⁹⁶ Cronje, R. and Fullan, A. (2003). "Evidence-based medicine: toward a new definition of 'rational' medicine." *health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine* 7(3): 353-369

scientific.

Given the extensive training they receive, medical doctors are expected to care for patients while maintaining objectivity and neutrality. Doctors' authority is reinforced, in part, by the assumption that the care they provide is impartial and untainted by personal beliefs and opinions. However, research into chronic pain has a long tradition of identifying the struggles sufferers face as they come up against medical doctors' attitudes and pain beliefs.⁹⁷ Wilson et al. (1992), for instance, documented the pain beliefs of 95 first year medical students, who were then enrolled into a pain education course spanning two weeks. Five months after completing the course, students were more likely to report the belief that pain is a serious problem, and that pain problems are not imaginary.⁹⁸ Students were also more likely to describe working with pain patients as rewarding, while recognizing the complexity and difficulty of working with these patients.

As Wilson et al. argue, medical students are individuals who enter medical practice with pre-existing experiences and beliefs regarding health and medicine. As these beliefs can have real consequences for the kind of care doctors provide, it is essential to focus not only on ensuring adequate clinical training, but also on educating students in order to discourage negative attitudes towards patients and to foster positive pain beliefs. This argument is echoed by Sit et al. (2015), who surveyed doctors in Hong Kong in order to assess the beliefs and attitudes Asian physicians hold regarding chronic low back pain. The authors conclude that physicians in Hong Kong scored higher in biopsychosocial orientation to chronic low back pain due to the recent incorporation of more psychosocial content in undergraduate medical curricula in Hong Kong.⁹⁹ Since physicians' attitudes and assumptions regarding pain have a significant influence on their patients' pain beliefs, as well as on the treatments they prescribe, the authors emphasize the importance of encouraging positive pain beliefs among medical doctors.

This research suggests that doctors are not objective and that they do not practice medicine in a way that is entirely value-neutral. While biomedicine purports to be an objective and value-neutral approach, all medical models take certain ideological positions regarding the role of medicine, the diagnosis and management of illness, and what constitutes health and illness. While

⁹⁷ Sit, R.W., Yip, B.H., Chan, D.C. and Wong, S.Y. (2015). "Primary care physicians' attitudes and beliefs towards chronic low back pain: an Asian study." *PLoS One* 10(1): e0117521

⁹⁸ Wilson, J.F., Brockopp, G.W., Kryst, S., Steger, H. and Witt, W.O. (1992). "Medical students' attitudes toward pain before and after a brief course on pain." *Pain* 50(1992): 251-256

⁹⁹ Sit et al. (2015), 3

there has been some interest in recent years on the importance of values and pain beliefs in medical education, the majority of research on pain education focuses on quantifying the number of hours of pain education medical students receive, such as Watt-Watson et al.'s (2009) survey of health science programs across Canada. The authors found that that 67.5% of surveyed health sciences programs were unable to account for specific hours designated to pain content in their curricula, and that, on average, Canadian veterinarians receive up to five times more pain management training than other health sciences programs.¹⁰⁰ Other studies, including Mezei and Murinson's work on pain education in North America, have also noted a significant lack of pain content in undergraduate medical programs.¹⁰¹ While such research allows us to identify the urgent need for additional pain content in medical curricula, I argue that it is equally important to know what kind of content is being taught to medical students, and what values and beliefs about the body and pain are being transmitted through this content. As of yet, I have found few studies evaluating the pain models, theories and assumptions framing pain content, and whether this content aligns with the conclusions of the chronic pain literature.

Instead of speculating as to why chronic pain often goes untreated or undertreated in Canada, and why doctors struggle to effectively manage patients' pain, we can trace the basis of doctors' decisions in clinical practice to the ways in which they learn to treat chronic pain in medical school. In doing so, we must recognize that medical knowledge is not objective, and that by extension, doctors do not treat pain in a way that is value-neutral. Pain theories and recommendations for effective pain management are heavily contested, and guidelines change frequently. Furthermore, as we have seen, doctors' pain beliefs significantly impact the ways in which they diagnose and treat chronic pain. As such, in addition to quantifying the number of hours of pain education medical students receive, there is also a great need to study what, and how, medical students learn about pain.

¹⁰⁰ Watt-Watson, J., et al. (2009). "A survey of prelicensure pain curricula in health science faculties in Canadian universities." *Pain Research and Management* 14(6), 441-2

¹⁰¹ Mezei, L. and Murinson, B.B. (2011). "Pain Education in North American Medical Schools." *The Journal of Pain* 12(12): 1199-1208

Summary

In this chapter, I reviewed the literature on chronic pain in order to describe major trends and debates in the field. In particular, I focused on the work of Melzack and Wall, and the importance of the gate control theory in changing our understanding of pain mechanisms and the role of psychosocial factors in this process. The history of these competing pain theories will be particularly important in assessing the content on pain mechanisms and manifestation at the three medical schools studied here. I also highlighted some of the work that has been done in the social sciences on chronic pain, and the significance of this work in developing a biopsychosocial model of pain.

Having described the work of Engel and Romano in developing a biopsychosocial medical model, I moved on to consider why pain continues to be treated almost exclusively from a biomedical approach, despite the consensus in pain research that a biopsychosocial model is more effective in pain management. In making sense of this contradiction, I traced the history and features of biomedicine in order to describe the ways in which this model has retained its authority as the dominant medical model. In particular, I focused on the claim that biomedicine is objective and value-neutral, and that its basis in science means that biomedicine is unquestionable and infallible. In disputing this claim, I referenced research on pain beliefs and values, and how physicians' attitudes towards chronic pain affect pain management decisions and treatment outcomes.

In the next chapter, I begin my assessment of pain content in undergraduate medical curricula in Ontario. I start by describing the standards regulating this content, noting that there are very few international or national standards regulating what students are expected to learn about pain. In particular, I focus on the lack of pain-related entry-to-practice competency requirements in Canada. I also touch on the pain curriculum guidelines that have been developed by the IASP and the Mayday Foundation, which provide recommendations for pain objectives and content but are not mandatory or binding.

Chapter Three: Standards Regulating the Medical Curriculum

In Chapter One, I described the four dimensions constituting the curriculum. While in this thesis I am concerned with the first two—the intentions of planners and the procedures adopted to implement these intentions—a better understanding of these dimensions will allow some insight into the other two. In this chapter I begin to detail the results of my findings by starting with the first of the dimensions, the intentions of curriculum planners as they plan, develop, and organize the curriculum. To do so I examine the international, national, and provincial standards regulating pain content in medical programs. In particular, I am interested in entry-to-practice competency requirements, as well as the inclusion of “pain” as a disease in its own right in medical students’ qualifying examinations.¹⁰² I also describe the IASP Interprofessional Pain Curriculum, and the influence of this outline on undergraduate curriculum planners.

Researching the standards regulating pain education proved much more difficult than I had anticipated. When I searched online for the general standards regulating medical education in Canada, I expected that I would find standards on pain content just as easily. This was not the case. Organizations seemed equally confused when I e-mailed or called to inquire about standards regulating pain content in the curriculum. The Medical Council of Canada (MCC) directed me to The Association of Faculties of Medicine of Canada (AFMC), while the AFMC felt that the Royal College of Physicians and Surgeons of Canada was better positioned to answer my questions. When I attempted to contact the College, I did not receive a reply. Confused by these answers, I contacted curriculum planners at the three schools I was studying, and I asked if they could describe the standards regulating pain content in the medical curriculum. One educational developer from School Two, in response to my question about the provincial, national, and international standards regulating pain content in Ontario medical curricula, replied: “Unknown.” These responses reflect, in part, the lack of standards regulating pain education in Canada, as well as uncertainty regarding who should be responsible for developing such standards.

¹⁰² Siddall, P.J. and Cousins, M. (2004). “Persistent pain as a disease entity: implications for clinical management.” *Anesthesia & Analgesia* 99(2): 510-20

Standards and Objectives Shaping Medical Curricula in Canada

Before describing the standards regulating pain content in Canada, I take a moment here to briefly outline how medical schools in Canada are accredited. Without knowledge of this process, it is difficult to contextualize these standards or understand in what ways medical schools are responsible for meeting curricular standards. While medical schools in Canada are held to certain accreditation standards that they must satisfy, there also exist non-binding principles and objectives that medical schools strive to meet in order to prepare their students for practice.

Medical schools in Canada are jointly accredited by the Committee on Accreditation of Canadian Medical Schools (CACMS) and the Liaison Committee on Medical Education (LCME) in the United States.¹⁰³ Since 1965, the Association of Canadian Medical Colleges (ACMC) has worked with the LCME in accrediting Canadian medical programs. In 1979, the ACMC joined the Canadian Medical Association in founding the CACMS, which now works jointly with the LCME in the accreditation process. The accreditation standards developed by these organizations address items in a total of twelve categories, including academic and learning environments, curricular content, and medical student selection, assignment, and progress. In order to ensure that standards are being upheld, a team of experts performs a full on-site assessment of each faculty at least once every eight years. This team prepares a formal report, which is reviewed by the CACMS.

In addition to these accreditation requirements, medical schools in Canada are also expected to incorporate the CanMEDS Physician Competency Framework into their curriculum. This framework was developed by the Royal College of Physicians and Surgeons of Canada in 1996, and has since been updated in 2005 and in 2015. The goal of CanMEDS is to define the necessary competencies for practicing medical doctors, and to provide a foundation for medical education and practice in Canada. To this end, the framework identifies the abilities physicians must possess in order to meet the health care needs of the people they serve. These abilities are grouped thematically under seven roles: Communicator, Collaborator, Leader, Health Advocate, Scholar, and Medical Expert.¹⁰⁴ Medical doctors in Canada are expected to fulfil each of these

¹⁰³ “Committee on Accreditation of Canadian Medical Schools (CACMS).” The Association of Faculties of Medicine of Canada. www.afmc.ca/accreditation/committee-accreditation-canadian-medical-schools-cacms

¹⁰⁴ “About CanMEDS.” The Royal College of Physicians and Surgeons of Canada. <http://www.royalcollege.ca/portal/page/portal/rc/canmeds/about>

roles, and each of the medical programs studied here integrates these roles into their curriculum design such that graduates from the program satisfy each of these competencies.

Medical curriculum content is also informed by the Medical Council of Canada's (MCC) Objectives for the Qualifying Examination. This document identifies the attributes expected of graduates from medical programs who enter supervised and independent practice in Canada. The objectives consist of a number of clinical presentations that a doctor is expected to recognize when presented with a patient. Students' knowledge of these presentations is tested in Part 1 and Part 2 of the Medical Council of Canada Evaluating Examination; students must pass these exams in order to be awarded the Licentiate of the Medical Council of Canada and have their names entered into the Canadian Medical Register. Universities map these presentations into the curriculum in order to prepare students for the qualifying examinations.¹⁰⁵

Accreditation shapes curricular content in two ways. First, by conducting regular external reviews of curricular content and organization, accreditation by organizations such as the CACMS ensure that medical schools meet national standards. These standards are described in a document prepared by the CACMS, and include the scope of academic activities, organization and administration, and curricular planning and implementation.¹⁰⁶ In addition to ensuring external review, accreditation also provides an opportunity for medical schools to engage in what the CACMS describes as "institutional self reflection," by which medical schools self-regulate in order to ensure that the medical education students receive adheres to the expectations of the CACMS. Medical schools that do not meet the minimum requirements for accreditation may receive a warning, be placed on probation, or be denied accreditation or have accreditation withdrawn. Given the implications of the CACMS' decisions regarding accreditation, medical schools must adhere to CACMS standards and expectations or risk no longer being able to offer an MD program. In this way, CACMS standards play a critical role in shaping curricular content and organization.

¹⁰⁵ "Objectives for the Qualifying Examination: Third Edition." The Medical Council of Canada. www.mcc.ca/wp-content/uploads/qualifying-examination-objectives.pdf

¹⁰⁶ "The Accreditation of Canadian University CME/CPD Offices." (1 January 2010). Committee on the Accreditation of Continuing Medical Education. https://www.afmc.ca/sites/default/files/documents/en/Accreditation/FINAL_CACME_Standards_2010_ENGLISH.pdf

Entry-to-Practice Competency Requirements

Having described the regulatory environment shaping medical curricula in Canada, I continue now by identifying some of the standards related to pain competencies in particular. Interestingly, I found through my research that there are no international, national, or provincial standards regulating pain content in Canada. In 2013, Watt-Watson et al. studied entry-to-practice competencies related to pain across various health sciences, including medicine, dentistry, and nursing.¹⁰⁷ Other than dentistry, which included two pain competencies, and nursing, which included nine, the authors found no references to pain competencies in the remaining health science competency requirements, including medicine. Entry-to-practice requirements in Canada do not include any expectation that doctors can manage or assess pain as a disease in its own right, nor are they expected to demonstrate knowledge related to pain mechanisms, assessment, measurement, or management.¹⁰⁸

While entry-to-practice competency requirements include the expectation that doctors should be able to recognize and treat diseases such as diabetes mellitus, hypertension, anxiety, and cardiac arrest, students are not expected to be able to recognize or treat pain as a disease in its own right. Instead, pain is included in entry-to-practice competency requirements only as a symptom of other diseases. Given the emphasis in the literature on conceptualizing pain as a disease rather than a symptom,¹⁰⁹ this is particularly concerning, especially since other health professions such as dentistry and nursing do include pain as a disease, not a symptom, in their entry-to-practice competencies. The implications of the lack of pain-related competency requirements are significant. According to Watt-Watson et al. (2013), “Academic accrediting bodies and professional regulatory bodies strongly shape curricula through the regulations they impose.”¹¹⁰ Given the lack of pain-related entry-to-practice competency requirements, the authors conclude that most of the health professions do not recognize “a baseline understanding of knowledge, skills,

¹⁰⁷ Watt-Watson, J. et al. (2008). “Entry to practice pain competencies: Survey of requirements for health science students.” *Pain Research and Management* 13, 111-53

¹⁰⁸ *ibid.*, 29

¹⁰⁹ Morris, D.B. (2003). “The challenges of pain and suffering.” In T.S. Jensen, P.R. Wilson, and A.S.C. Rice (Eds.), *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press.

¹¹⁰ Watt-Watson, J. et al. (2008), 26

and judgment related to pain assessment and management” as a priority.¹¹¹ A previous study conducted in 2008 arrived at similar findings, noting minimal evidence of pain management in the competencies of numerous health professions beyond the inclusion of pain as a symptom.¹¹²

Given that entry-to-practice requirements significantly shape curriculum content, the lack of pain competencies in Canada has implications for the pain education medical students receive. In their study on pain-related competency requirements, Watt-Watson et al. (2013) also compared the competency requirements of health programs to those of veterinary medicine, finding that the national requirements for veterinary medicine list a total of ten pain competencies, nine of which relate to analgesic and anaesthetic management, with one additional competency on alleviating suffering.¹¹³ In an earlier study conducted by Watt-Watson et al. (2009), the authors also found that veterinarians receive up to five times more training in pain management than other health professions, including medicine.¹¹⁴ In comparing these studies, I would suggest that the differences in pain content in the curricula may be due, in part, to differences in competency requirements for these two professions.

In order to address the lack of entry-to-practice pain competency requirements in North America, in 2012 an interprofessional group of pain experts participated in a consensus project funded by the Mayday Foundation in California.¹¹⁵ From this process the members produced a list of 21 pain assessment and management core competencies under four domains: the multidimensional nature of pain, pain assessment and measurement, management of pain, and clinical conditions.¹¹⁶ The committee also came to a consensus on a number of core values and principles which should be incorporated into the development of pain curricula and learning activities, including advocacy, cultural inclusiveness, and ethical treatment, among others.¹¹⁷ While these competencies are not binding, they are meant to represent a minimum standard for pre-licensure education that can be tailored to the specific needs of any health profession. In

¹¹¹ *ibid.*, 29

¹¹² *ibid.*

¹¹³ *ibid.*

¹¹⁴ Watt-Watson, J. et al. (2009), 441

¹¹⁵ Watt-Watson, J. and Siddall, P.J. (2013). “Improving Pain Practices Through Core Competencies.” *Pain Medicine 14*: 966-967

¹¹⁶ Fishman, S.M., et al. (2013). “Core Competencies for Pain Management: Results of an Interprofessional Consensus Summit.” *Pain Medicine 14*: 971-981

¹¹⁷ *ibid.*, 977

mapping these competencies onto existing curricula, programs can also identify gaps and areas for improvement.

The IASP Interprofessional Pain Curriculum

Similarly, the IASP has also published an Interprofessional Pain Curriculum that outlines a suggested model for teaching pain to health professionals.¹¹⁸ In addition to this interprofessional curriculum, the IASP has also developed uniprofessional curricula for pain education in pharmacy, nursing, dentistry, and other health professions. Each pain curriculum is based on four core components: the multidimensional nature of pain, pain assessment and measurement, management of pain, and clinical conditions. The interprofessional curriculum was developed by a subgroup of the IASP Task Force on Professional Education from 2010 to 2012. The resulting outline is meant to guide pre-licensure or undergraduate programs, with the recommendation that learning be balanced between core lectures and small group work. Given that effective pain management requires expertise that exceeds the knowledge and skills of any one profession, the IASP also recommends interprofessional education as the ideal approach to organizing a pain curriculum. In order to foster collaboration, the curriculum should therefore “provid[e] a common basis for different professions to learn the same language as well as a basic understanding of pain mechanisms and major biopsychosocial concepts important to all.”¹¹⁹

This emphasis on a biopsychosocial approach is repeated consistently throughout the IASP curriculum: students are to be taught that pain is a multidimensional, biopsychosocial experience, and to consider the biopsychosocial nature of pain in choosing both pharmacological and non-pharmacological treatments. Furthermore, when learning about the taxonomy of pain systems, students are expected to understand the importance of biopsychosocial factors in the perception of pain. One of the principles of the IASP Pain Curriculum is the consideration of pain as a sensory, emotional, cognitive, developmental, behavioural, spiritual, and cultural experience. Given this, students are expected to learn that biological, psychological, and social factors should be given equal weight in pain management. Doctors’ and caregivers’ pain beliefs, as well as their fears and

¹¹⁸ “IASP Interprofessional Pain Curriculum Outline.” (2012). International Association for the Study of Pain, <http://www.iasp-pain.org/Education/CurriculumDetail.aspx?ItemNumber=2057>

¹¹⁹ *ibid.*

anxieties surrounding pain and drug addiction, are covered at length in the curriculum, as are political issues such as pain management as a human right. The curriculum also includes a breadth of non-pharmacological methods for pain management, ranging from psychological and behavioural strategies to neuromodulation and complementary and alternative medicine.

The IASP Pain Curriculum is a tool to be used by curriculum planners in developing a comprehensive, interprofessional pain curriculum, as well as a uniprofessional curriculum for specific health professions. However, these recommendations are not binding in the sense that medical programs do not have to integrate any of the suggestions into their pain curriculum (although most programs do to some extent). In researching the three medical curricula studied here, I found that each program follows the IASP curriculum to varying degrees, implementing some suggestions while ignoring others. For example, while School One takes a more interprofessional, collaborative approach to the pain curriculum than School Three, the pain content taught at School Three follows the biopsychosocial approach advocated by the IASP more closely than School One.

Summary

In this chapter, I focused on the standards regulating what medical students are expected to know about pain and pain management after graduating from an undergraduate medical program in Canada. First, I described the accreditation standards medical schools are expected to meet, and how these standards shape curricular content. Having examined this accreditation process, I moved on to consider entry-to-practice competency requirements in Canada. While pain is included in entry-to-practice competency requirements as part of the etiology of many diseases, students are not expected to be able to manage pain as a disease in its own right. Given the impact of such regulating standards on curriculum content, I argued that it is imperative to improve these standards such that pain management is included. Such changes would also assist in standardizing pain education across Canada.

In the next chapter, I explore the organization of pain content in Canadian medical schools, highlighting the fragmentation of pain content in the curriculum and the lack of collaboration among programs. In doing so, I analyze major trends in pain content collected from a variety of sources. I then compare the organization and delivery of pain content in the three programs studied

here, noting that overall these programs reflect the tendency towards introducing pain concepts early in the curriculum, fragmenting pain content throughout general required courses, and teaching pain content primarily through lectures and small group sessions.

Chapter Four: The Organization of Pain Content in the Medical Curriculum

Before conducting a detailed analysis of pain content in the curriculum, I began by charting a broad picture of pain education in Ontario and in Canada. While my primary interest is in the content itself and what undergraduate medical students learn about pain and pain management, it is also important to understand how this content is organized into the curriculum. Contextual factors such as when students are introduced to the concept of pain management, how pain content is integrated into the curriculum, and the total number of hours of pain education received have an important influence on students' pain education.¹²⁰

In the previous chapter, I outlined the international and national standards shaping pain content in the curriculum, including the MCC Objectives for the Qualifying Examination and the IASP Interprofessional Pain Curriculum. In this chapter, I narrow my focus to the institutional level, in order to examine how these standards are mapped onto the curriculum and how pain content is structured into the curriculum. I begin by referring to the AAMC Curriculum Inventory Reports on pain management in order to identify some of the major trends in the organization of pain content in undergraduate medical curricula in North America. Next, I provide an overview of the organization of each of the three medical curricula studied here, and how each program maps pain objectives onto the curriculum. I finish by comparing these findings to lessons from the literature on curriculum studies and pain education, in order to assess whether pain content is effectively structured into the curricula.

The Organization of Pain Education in North America

In 2010, Mezei and Murinson conducted a study of pain content in North American medical schools accredited by the Liaison Committee on Medical Education. A total of 104 US medical schools and 13 Canadian schools were studied, with data drawn from the AAMC's centralized repository of curricular information, CurrMIT. The authors found that the majority of pain content in US and Canadian medical schools is taught using one of three delivery mechanisms: within another course, within a required pain-specific course, or as a session or topic within an elective

¹²⁰ Fish, D. and Coles, C. (2005), 154-6

course.¹²¹ Overall, pain is most often taught in the context of a general required course, with most sessions lasting approximately one hour in duration. The authors also found that most programs display curricular fragmentation in pain content, such that total pain content is widely spread throughout the curriculum. Finally, although 92.3% of Canadian medical schools include pain sessions in at least one course (compared to 79.8% of US schools), the total number of pain teaching hours per school ranged from 3 to 76 hours, with a mean of 27.56 hours.¹²²

Having reviewed their findings, the authors raise a number of concerns. They note, for instance, that the fragmented nature of most pain content leads to a fragmented learning experience. While most medical curricula take a “spiral” approach in which students learn foundational material which is built upon throughout the program, branches of medicine such as oncology, dermatology and cardiology are typically taught within discipline-specific courses and expanded upon over time. In contrast, pain content has no “home,” given that most programs do not have a pain curriculum. As Hauser puts it: “Multiple opportunities for training do not necessarily lead to quality instruction...when something has a bunch of different homes, in fact, it sometimes has no home.”¹²³ Given that effective pain education includes intellectual, emotional, technical, and ethical learning, Mezei and Murinson argue that a fragmented curriculum does not provide students the opportunity to acquire competence in each of these dimensions. Instead, when content is delivered as an isolated topic throughout a number of sessions, research suggests that students’ pain education is largely restricted to the cognitive realm.¹²⁴

Mezei and Murinson conducted their study in 2010, and since then their findings have been widely cited as demonstrating some of the issues prevalent in undergraduate pain education in North America. In order to focus specifically on Canada and to compare these results to the most recent data, I contacted the AAMC and requested a Curriculum Inventory Content Report of pain content in Canadian medical schools. The AAMC ran the report and provided me with the results. However, they noted that only five out of seventeen Canadian medical schools had participated in

¹²¹ Mezei, L. and Murinson, B.B. (2011). “Pain Education in North American Medical Schools.” *The Journal of Pain* 12(12): 1199-1208

¹²² *ibid.*, 1201-3

¹²³ Thomson, P. (2006). “Lessons of Pain: A Symptom Stretched Across All Specialties.” *The New Physician* 55(8)

¹²⁴ Murinson, B.B., Agarwal, A.K. and Haythornthwaite, J.A. (2008). “Cognitive expertise, emotional development, and reflective capacity: Clinical skills for improved pain care.” *The Journal of Pain* 9, 975-983

the most recent Curriculum Inventory (2014-2015), and that out of these five schools, only four reported data on pain content. In preparing this report, the AAMC searched all available curriculum content related to the search criteria “pain management.”

On average, the report shows that the majority of pain management content is taught in the first two years of undergraduate medical curricula. On average, the reporting schools offer a total of five pain-specific courses, and an average of eight teaching or learning events related to pain throughout the curriculum. This number indicates that medical programs may have developed more pain-specific courses in the curriculum since 2010. In terms of methods of delivery, all four programs used lectures, two schools used discussion groups, one school used problem-based learning events, and one school taught pain content through self-directed learning. While the AAMC lists numerous resources that can be drawn upon to teach pain content, few of these resources were utilized by the reporting schools. In terms of assessment of outcomes, none of the schools reported assessment methods. Overall, these results from 2014-2015 echo Mezei and Murinson’s findings, while also providing additional insight into the instructional methods and resources used to teach pain management.

In reflecting on the organization of pain content in the curriculum, Mezei and Murinson suggest that all medical programs should include integrated, pain-focused courses early in students’ education.¹²⁵ According to the AAMC reports, most pain content is taught in the first two years of the program, in compliance with IASP guidelines. The early introduction of pain content in the curriculum is therefore a positive step forward. However, the total number of hours of pain education among medical programs varies significantly and is generally low, particularly compared to other health professions.¹²⁶ Furthermore, the literature on pain education, as well as the IASP Interprofessional Curriculum, recommends that pain content be delivered through multiple approaches: lectures, workshops, learning labs, multidisciplinary panels, small group discussions, and expert guest speakers.¹²⁷ In reviewing the data available regarding instructional methods used, it is apparent that pain management is taught using a limited number of resources and delivery methods.

¹²⁵ Mezei, L. and Murinson, B.B. (2011), 1205

¹²⁶ Watt-Watson, et al. (2009), 441

¹²⁷ Wittert, G.A. and Nelson, A.J. (2009). “Medical education: Revolution, devolution and evolution in curriculum philosophy and design.” *Medical Journal of Australia* 191, 35-7

In addition to these guidelines, the IASP also promotes interprofessional learning as a means of fostering an appreciation for the importance of an interdisciplinary approach to pain management among medical students.¹²⁸ Unfortunately, the AAMC reports from 2009-2010 and 2014-2015 do not indicate whether pain content is taught in an interprofessional setting. Given the importance of an interprofessional approach to pain management, the AAMC might consider the inclusion of such information in future reports. The literature on pain education also recommends that medical programs share objectives and materials rather than re-creating their own materials, not only for the purposes of standardization but also to ease the burden of developing a pain curriculum.¹²⁹ Tools such as the AACM's CurrMIT portal provide an excellent opportunity for collaboration among medical programs, as curriculum content can be searched and downloaded from the database. The fact that only five Canadian schools participated in the Curriculum Inventory and only four reported pain management coverage may indicate a lack of collaboration among medical schools.

In the following section I will describe the organization of pain content in the three curricula studied here. In doing so I will briefly outline the structure of each medical program, as well as the major pain objectives and pain-specific sessions within each curriculum. In addition to providing an overview of this content, I will also note the ways in which this content is delivered and the instructional methods used. I will finish with a summary of the major trends in pain content organization I have noted here, ending with a consideration of this organization in light of recommendations from curriculum studies and the pain education literature.

School One

The curriculum at School One is guided not only by the CanMEDS principles, but also by a set of competencies and themes that are integrated throughout the curriculum. The undergraduate medical program at School One lasts four years, with the first two years dedicated to pre-clerkship and the third and fourth year spent in clerkship. At School One, pre-clerkship consists of two types of courses: block courses and continuity courses. Block courses, which occupy much of the

¹²⁸ Hunter, J., Watt-Watson, J., et al. (2008). "An interfaculty pain curriculum: Lessons learned from six years experience." *Pain 140*, 74-86

¹²⁹ Mezei, L. and Murinson, B.B. (2011), 1206

student's time during the first two years of the program, include a mixture of lectures, seminars, laboratory sessions, and problem-based learning tutorials. These courses provide the foundations of students' theory and practice. Continuity courses, which take place over half-day blocks, are taught using a variety of instructional methods. In clerkship, students participate in core clinical courses in the third year, followed by electives and campus-based teaching in the fourth year.

Compared to the other two programs studied here, the pain content at School One is not fragmented throughout general required courses, but instead mostly concentrated into an interprofessional week of pain education in students' second year. This pain week is part of a block course in which students learn about the mechanisms of disease and system-based medicine. The pain week at School One is based on an interprofessional curriculum in which students from a variety of departments (dentistry, nursing, social work, etc.) come together to learn about pain management. This interprofessional approach meets the program's guiding competency of the physician as a collaborator, and also promotes the importance of a multidisciplinary approach to pain management. Pain content is delivered through a mixture of large group lectures and small group workshops. The large group lectures consist of sessions on the following topics: pharmacological treatment of pain, back pain treatment, sports injuries, cancer pain, dried cannabis for pain, mechanisms and manifestations of pain, pain and mental health, pediatric pain, vaccination pain, amputee rehabilitation, shoulder rehabilitation, and rehabilitation following brain and spinal cord injury. The small group sessions include a patient panel, facilitated working groups, and two half-day interprofessional case sessions.

Beyond the interprofessional pain week, pain content at School One is also incorporated into general required courses throughout the curriculum. In pre-clerkship, students learn about pain in courses on pharmacology, neuroanatomy and neurophysiology. In clerkship, students are required to complete a core clinical rotation on anaesthesia, where the focus is mostly on acute pain as a symptom and the management of pain in the perioperative period. Students also learn about pain in clerkship clinical rotations on emergency medicine, medicine, obstetrics and gynaecology, and paediatrics. In these rotations pain is mostly integrated as a presenting symptom of various diseases, and the focus is largely on acute pain rather than chronic pain management. In terms of electives, School One offers two electives that include "chronic pain" as a learning experience. The first provides students with exposure to an outpatient ambulatory rehabilitation site, and the second offers experience at a clinic for chronic pain management. While I was able

to find 24 elective options with “pain” as a learning experience, most of these were in palliative care.

School Two

The medical program at School Two is based on a spiral curriculum framework in which the first two years of the program are dedicated to scientific, clinical, and professional foundations. This foundational knowledge is further expanded upon in clerkship. While most foundational material is taught in pre-clerkship, the remaining two years of clerkship are structured around experience-based learning. As a whole, the curriculum is guided by a number of values such as learning, citizenship, and scholarship, as well as the CanMEDS roles.

At School Two, most pain content is integrated into general required courses. While there is no specific pain curriculum at School Two (though this is something they are working to develop), the curriculum features over 100 pain objectives, most of which are taught as part of general required courses. In pre-clerkship, pain objectives are included in learning events on physiology, neuroanatomy, and clinical foundations courses. The concept of “chronic pain” is introduced for the first time in a first year course on fundamentals of family medicine, where students learn about nociceptive and neuropathic pain, as well as analgesic medications to manage pain.

The primary pain sessions at School Two take place during clerkship. In year three, students learn about pain management during a session on prescribing pharmaceuticals for persistent pain. In their fourth year, students attend a lecture on chronic pain management delivered by an expert guest speaker, as well as a session on pain management organized by the anesthesiology department. In researching electives offered by School Two I was able to find only two that were related to pain and/or chronic pain. One of these is a rotation organized by the anaesthesia department and the other is an opportunity to work with a multidisciplinary rehabilitation team specializing in acute and chronic neuromusculoskeletal pain problems.

School Three

The curriculum at School Three is centred largely around case-based learning and community engagement. The curriculum is guided not only by the seven CanMEDS competencies, but also by five complementary themes, including foundations of medicine and clinical skills in health care. In addition to these themes, there are multiple “curricular threads” running throughout the curriculum. These include interprofessional education and work, gender issues, and health effects of social problems. As is the case with Schools One and Two, School Three offers a four-year program divided into pre-clerkship and clerkship. This program is further divided into three phases: Phase 1 takes place over years one and two, Phase 2 covers year three, and Phase 3 occurs during the fourth year of the program. Phase 1 provides an academic and clinical foundation for clerkship in Phases 2 and 3. Each phase is further segmented into a number of case-based modules, which focus on specific learning activities taught through large group sessions, small group sessions, structured clinical skills sessions, laboratory sessions and community and interprofessional learning. Since the medical program at School Three is organized by a modular curriculum, students are largely taught in case-based small group settings and in clinical rotations. Given this modular design, pain content is mostly taught in general required courses.

Over 400 pain objectives are integrated throughout School Three’s curriculum, with most of the objectives met in the first two years of the program. The majority of this content includes pain as a symptom of another disease, or focuses on acute pain conditions such as acute abdominal and chest pain. Chronic pain content is mostly delivered during sessions on end-of-life care, as well as a session on physiology and pharmacology of pain taught during students’ second year. While School Three offers a variety of medical electives, their catalogue is not searchable by keyword, making it difficult to assess the pain-related elective options available. Students can search by “discipline,” but pain is not included as a searchable discipline. Although anaesthesia is available as a clerkship elective, the session’s objectives relate mostly to clinical skills such as intubation, ventilation, and airway management, as opposed to chronic pain management.

Integrating Pain into the Curriculum: Lessons from the Literature

In going through the organization of pain content in the three curricula studied here, a number of trends emerge, many of which reflect the data compiled in the AAMC Curriculum Inventory Reports. Comparing these trends to recommendations made in the literature reveals additional interesting tendencies. First, the IASP emphasizes in its fifth principle the importance of introducing pain management early in medical students' education. The AAMC reports found that, while pain content is distributed throughout all four years of most medical programs, there was an overall concentration of pain content in the first two years. While two of the medical schools studied here deliver most of their pain content in the first two years of the program, at School Two, the primary pain sessions take place in years three and four.

Furthermore, although the literature recommends that pain management be taught in cohesive, pain-specific courses, the AAMC reports indicate instead a large amount of curricular fragmentation. The three medical programs studied here echo this trend. While School Two and School Three surpass most of the schools reporting to the AAMC by featuring over a hundred pain objectives in the curriculum, these objectives are dispersed throughout the curriculum and mostly taught in general required courses or electives. In contrast, School One organizes pain content within pain-specific courses that are delivered during an interprofessional pain week, allowing for cohesion in students' pain education.

The literature on pain education promotes the use of a wide range of instructional methods and resources. There is evidence that the delivery of content through small group sessions and case-based learning as opposed to large group lectures allows for increased comprehension and grasp of concepts among students.¹³⁰ School Three demonstrates the greatest adherence to these guidelines, given its modular approach to curriculum design, although School One and School Two also integrate some small group sessions and workshops. In addition to teaching pain content through smaller, case-based group sessions, it is equally important to use a variety of resources in delivering pain content. As pain management is an intellectual, technical, emotional, and ethical experience, a well-developed pain curriculum should promote students' development in each of

¹³⁰ Durand Thomas, M., O'Connor, F.W., Albert, M.L., Boutain, D., and Brandt, P.A. (2001). "Case-Based Teaching and Learning Experiences." *Issues in Mental Health Nursing* 22(5), 517-531

these areas.¹³¹ Research suggests that this requires not only that pain management be taught in small group-based, pain-specific courses, but also that pain content be taught using resources that emphasize the multidimensional experience of treating pain.¹³² While the AAMC report includes over thirty instructional methods that can be utilized by programs in delivering pain content, very few of these methods are used in the programs studied here. While all three programs used a mixture of large and small group sessions, the instructional methods used do not represent the plethora of resources instructors can draw upon in delivering pain content to students. The AAMC, for instance, lists a variety of instructional methods including demonstrations, mentorship, patient presentations, reflection, research, and case-based learning, none of which were used by the reporting schools.

Finally, in discussing the organization of pain content it is interesting to note that only five Canadian schools participated in the AAMC report for 2014-2015, and only four schools reported pain content. In discussing pain content with curriculum planners at each of the schools studied here, I found that two of the schools (School Two and School Three) do not have a pain curriculum, although both programs are looking into developing one. Furthermore, while School One does have a pain curriculum, the program's pre-clerkship curriculum (which includes the interprofessional pain week) is in the process of being re-designed. Designing a curriculum can be labour-intensive and expensive.¹³³ In order to facilitate this process, tools such as the AAMC's CurrMIT portal would allow for collaboration among medical programs, such that they could share objectives, materials, and resources. Collaboration would also allow for greater consistency and standardization in pain content and education in Canada.

Summary

In this chapter I examined the organization of pain content in undergraduate medical curricula. I began by identifying major trends in the delivery of pain content, focusing on AAMC reports from 2009-2010 and 2014-2015. Overall, I found that medical curricula structure pain

¹³¹ Murinson, B.B., Agarwal, A.K. and Haythornthwaite, J.A. (2008), 8

¹³² Wittert, G.A. and Nelson, A.J. (2009). "Medical education: Revolution, devolution and evolution in curriculum philosophy and design." *Medical Journal of Australia* 191, 35-7

¹³³ Mezei, L. and Murinson, B.B. (2011), 1206

content in such a way that most content is delivered in the first two years of the program. The majority of this content is delivered through lectures, as well as through large and small group discussions. I also found that the total amount of pain content varies widely among programs, with teaching hours ranging from 3 to 76 hours with a mean of 27.56 hours. I also found that most medical curricula use a limited amount of instructional resources in teaching pain content, and that this content tends to be fragmented throughout the curriculum.

In general, the three curricula studied here reflect the national trends reported by the AAMC. Schools One and Three, for instance, include primary pain sessions early in the curriculum, although School Two does not introduce these sessions until clerkship. I also found that, overall, pain content is highly fragmented throughout the curriculum, particularly at School Two and School Three. In general, objectives related to pain and pain management in these curricula are dispersed throughout general required courses. I would suggest that this fragmentation may be due to the fact that these two programs, in contrast to School One, do not have a pain curriculum. All three programs also demonstrate a limited use of instructional methods, relying mostly on lectures and occasionally small group sessions. Finally, only one of the programs (School One) offers pain-specific courses that take an interprofessional approach to pain management.

In the next chapter, I turn my attention to the actual pain content of each curriculum. I begin by assessing content related to pain mechanisms and manifestation, as this content takes up the bulk of pain education at all three programs. The information students receive regarding pain mechanisms impacts not only their understanding of pain theories and issues related to nociceptive and neuropathic pain, but also the mechanisms of action underlying analgesics and other pain management therapies.

Chapter Five: Pain Mechanisms and Manifestation

In the previous two chapters, I explored the wider regulatory and institutional contexts within which pain content is developed and structured into the medical curriculum. In the third chapter, I described the lack of standards regulating pain content in Canada, and I also discussed the importance of developing entry-to-practice pain competency requirements for medicine. In Chapter Four, I narrowed my focus to the institutional level in order to identify some of the major trends in pain education in Canada, as well as the ways in which programs integrate pain content into their curricula. In this chapter, I start to analyze the actual pain content in each curriculum, beginning with content related to pain mechanisms and manifestation. In particular, I will focus not only on what students learn about these mechanisms, but the pain theories underlying contemporary understandings of the manifestation of pain, and how such conceptualizations impact the ways in which we approach pain management.

One of the most important and hotly debated topics in pain management is the issue of pain mechanisms and manifestation. When patients suffer from intractable, persistent pain, patients (and physicians) frequently ask themselves, “why?” Why do we suffer? Why do we feel pain? Why is the link between tissue damage and pain not always straightforward? Responses to these questions have ranged from biblical beliefs that pain is atonement for sin, to the modern idea that pain is an indicator of bodily malfunctioning.¹³⁴ While the contemporary view is that pain acts as a warning signal that something is wrong in the body, this theory does not account for the many situations in which people experience intractable pain unrelated to any observable tissue damage. In order to understand why we experience pain, and why people suffer from incurable pain seemingly without cause, we must start by examining the mechanisms underlying the experience of pain.

While I highlighted some of the basic features of the major pain theories in Chapter Two, I will expand on this discussion by describing the history of scientific inquiry into pain mechanisms, and how this investigation is closely linked to theoretical assumptions about the purpose and physiology of pain. Next, I will identify what students learn about pain mechanisms and manifestation in each of the programs studied here. In doing so, I will examine how acute and

¹³⁴ Kotarba, J. (1983), 28

chronic pain are conceptualized in the curriculum, and how this content is integrated into students' education. These findings will also provide a foundation for understanding what students learn about pain treatments and pharmacology—which I discuss in Chapter Six—and the psychosocial determinants of health, which I explore in Chapter Seven.

A Brief History of Pain Theories

Our understanding of pain has largely followed the trajectory of Western medical perspectives on health and illness.¹³⁵ In Chapter Two, I described in some detail the biomedical framework in which contemporary Western health care systems operate. Engel (1977), for instance, identifies biomedicine as the “dominant model of disease today,” and he pinpoints molecular biology as its basic scientific discipline.¹³⁶ He also describes biomedicine as a model in which disease is understood as deviation from normal biological functioning, leaving no room for psychological or social dimensions of illness. From this perspective, biomedicine is seen as reductionist in its attempts to explain disease solely through the language of biology and chemistry. As a scientific model, Engel acknowledges that biomedicine is extremely useful for treating diseases in which one symptom is linked to one cause. However, he also argues that biomedicine has reached the status of dogma, requiring that discrepant data be forced to fit the model and that any apostates be condemned as heretics.

Kotarba (1983) echoes Engel in reminding us that while the perspective of biomedicine is taken for granted, particularly in contemporary Western societies, in actuality there are many other lenses through which we can make sense of health and illness. By tracing the history of the biomedical model, and the context in which it was developed and came to be adopted, we can situate biomedicine as one framework among many other possibilities. A health care system based on the social model of the disability rights movement, for instance, or the holistic model used in alternative medicine, would take a different perspective on health and how we should understand illness.

Throughout all of human history there have existed what we now define as diseases: disorders of a structure or function in the body that are experienced as threatening, harmful, or

¹³⁵ *ibid.*

¹³⁶ Engel, G.L. (1977), 130

undesirable.¹³⁷ In order to manage this experience, societies have designated individuals and developed institutions dedicated to evaluating, interpreting, and providing corrective measures to prevent or cure illness.¹³⁸ The institution of medicine, and the role of the medical doctor within this institution, evolved as one form of response to this social need. Over time, the scientific method was applied to medicine in such a way that medicine became a scientific endeavour, for which the goal is the “understanding, treatment, and prevention of disturbances which the public first had designated as ‘disease’ or ‘sickness.’”¹³⁹

In discussing the role of the scientific method in biomedicine and the theoretical foundations of this model, Engel refers to the role of the Christian Church in allowing the dissection of human cadavers. From this separation medicine came to be rooted in dualism, and scientific inquiry into the body was conducted as systemic, detached observation of the body and its function with little consideration of the mind or the self.¹⁴⁰ Taken as a collection of parts performing a specific function, the body came to be seen as a machine, and disease as the breakdown of this machine. Kotarba writes: “Just as Copernicus had displaced man and his world from the center of the universe, modern practitioners of medicine displace the analysis of *suffering* and all its metaphysical and religious connotations with an analysis of the body as a *machine* for which observable *causes* for disease could be discerned.”¹⁴¹

Engel acknowledges that biomedicine has been enormously successful in diagnosing, treating, and curing all types of diseases, particularly acute and infectious diseases. However, when it comes to more complex conditions such as chronic pain, a psychosocial experience for which one symptom cannot be linked to one cause, the biomedical model is found greatly lacking. From a biomedical perspective, pain is seen as a warning sign that some damage has been done to the machine of the body. The role of the doctor in treating pain, then, is to locate the source of this damage and to fix the machine. This approach, however, is largely ineffective when diagnosing

¹³⁷ Leach Scully, J. (2004). “What is a disease? Disease, disability and their definitions.” *EMBO reports* 5(7): 650-653

¹³⁸ Engel, G.L. (1977), 130

¹³⁹ *ibid.*, 130-1

¹⁴⁰ Dubos, R. (1968). *Man, medicine, and environment*. New York: New American Library, 78

¹⁴¹ Kotarba, J. (1983), 28

and treating chronic pain, as chronic pain is now understood to be a complex disease in its own right and not simply a symptom of tissue damage.¹⁴²

Mechanisms of Pain

The biomedical conception of pain described above dates back to Descartes, who wrote the first “scientific” theory of pain in his *Meditations on First Philosophy* published in 1641. In this text, Descartes describes pain as a signal that follows a direct pathway from the skin to the brain, in order to warn the body of danger to its mechanical integrity.¹⁴³ Descartes’ theory of pain was widely adopted in medical practice and drawn upon in order to seek effective analgesia for pain management. Based on this reductionist theory of pain, physicians mostly relied on opium, henbane, and other such drugs to target pain pathways directly and intervene in these mechanisms. In the nineteenth century, surgeons began to sever the pain pathways Descartes had described in attempt to provide further relief from pain.¹⁴⁴ It is interesting to note that these kinds of biomedical treatments—chemical and surgical interventions—persist as the primary analgesic treatments used today in pain management, despite having only limited effectiveness.

In the mid-nineteenth century, researchers began to question Descartes’ theory of pain. In particular, they wondered how Descartes’ hypothetical pain pathways could account for variations in the perception of pain, as well as the persistence of significant physical discomfort when no tissue damage or injury could be observed. In 1894, two competing theories of pain emerged in attempt to resolve these issues: von Frey’s specificity theory, and Goldscheider’s pattern theory. While I have described in the literature review the positions of both theories, it bears repeating that specificity theory assumes the existence of specific pain receptors that transmit signals to a pain

¹⁴² International Association for the Study of Pain. (2004). *EFIC’s declaration on chronic pain as a major healthcare problem, a disease in its own right*. <http://www.iasp-pain.org/files/Content/ContentFolders/GlobalYearAgainstPain2/20042005RighttoPainRelief/painasadisease.pdf>

¹⁴³ Descartes, R. (1998). *Discourse on method and Meditations on First Philosophy*. (Trans. D.A. Cress). Indianapolis: Hackett Publishing.

¹⁴⁴ Kotarba, J. (1983), 29

center in the brain, while pattern theory suggests that the brain receives pain messages when stimuli combine to produce a pattern or combination of pain signals.¹⁴⁵

Specificity theory came to dominate medical practice and thought, due largely to its adherence to biomedical assumptions about the body and pain. While specificity theory fits into biomedicine's emphasis on finding one cause for one symptom, it also focuses solely on physiological factors and is therefore conducive to chemical and surgical intervention.¹⁴⁶ Specificity theory persisted as the dominant pain theory until in 1965 Melzack and Wall proposed the gate control theory in an article published in *Science*. They further expand on the theory and its implications in *The challenge of pain*, published in 1982. In this text the authors propose the gate control theory of pain as a means of answering enduring questions about persistent pain and the role of psychosocial factors in pain perception. In the first half of the book, Melzack and Wall discuss at length the psychosocial dimensions of pain, including the influence of cultural and personal experiences on pain perception.¹⁴⁷ They identify factors such as cultural background, pain threshold, the meaning of the situation, feelings of control over pain, and the power of suggestion as psychosocial determinants shaping the experience of pain.¹⁴⁸ In doing so, one of the authors' stated goals is to account for these psychosocial factors in a theory that encompasses not only instances of acute pain, but also persistent pain for which a cause cannot be found or for which no cure is known.¹⁴⁹

I have described the finer physiological details of the gate control theory in the literature review, highlighting the role of this "gate" in activating the pathways that lead to the perception of pain. In providing a physiological basis for psychosocial aspects of pain, the gate control theory accounts for the importance of these factors in individuals' experience of pain and legitimizes these qualities of pain that had been dismissed as secondary to biological aspects. This new understanding of pain mechanisms also allowed for the eventual realization that persistent pain is not merely an instance of momentary pain that does not resolve quickly, but instead a disease in

¹⁴⁵ Moayed, M. and Davis, K.D. (2012). "Theories of pain: from specificity to gate control." *Journal of Neurophysiology* 109(1), 5-12

¹⁴⁶ Kotarba, J. (1983), 31

¹⁴⁷ Melzack, R. and Wall, P. (1996), 17-8

¹⁴⁸ *ibid.*, 15-28

¹⁴⁹ *ibid.*, 288

its own right characterized by changes in the properties of nociceptors and the circuits that these nociceptors engage in the spinal cord and at other levels.¹⁵⁰

In brief, the gate control theory provided a unified conceptual system of pain mechanisms while also stimulating new ideas and research.¹⁵¹ The advances made by Melzack and Wall have been further expanded upon as researchers discover the many ways in which psychosocial factors influence pain. Psychosocial determinants of health have been found to impact the onset, perception, and management of such conditions as headaches,¹⁵² peripheral neuropathies,¹⁵³ and complex regional pain syndromes.¹⁵⁴ Other studies have found a link between recurrent abdominal pain and negative events in the family,¹⁵⁵ as well as a link between chronic pelvic pain in women and a history of childhood abuse.¹⁵⁶ Psychosocial factors also play an important role in pain treatment and management. In describing the importance of psychological therapy in treating pain, Sandroni et al. (2003) conclude: “No chronic pain syndrome can be treated successfully without a multidisciplinary approach that includes behavioral/psychological management.”¹⁵⁷

Given the importance of psychosocial determinants of health in diagnosing and treating chronic pain, in recent years the literature has moved away from psychogenic explanations through which pain is seen solely as a psychological experience if a biological cause cannot be found.¹⁵⁸

¹⁵⁰ Basbaum, A. and Jessell, T. (2000). “The perception of pain.” In E.R. Kandel, J.H. Schwartz, T.M. Jessell (Eds.), *Principles of Neural Science 4th Edition*. New York: McGraw-Hill.

¹⁵¹ Melzack, R. and Wall, P. (1996), xiv

¹⁵² Holroyd, K.A. and Lipchik, G.L. (1999). “Psychological Management of Recurrent Headache Disorders: Progress and Prospects.” In R.J. Gatchel and D.C. Turk (Eds.) *Psychosocial Factors in Pain: Critical Perspectives*. New York: The Guilford Press.

¹⁵³ Shembalkar, P. and Anand, P. (2003). “Peripheral neuropathies.” In T.S. Jensen, P.R. Wilson, and A.S.C. Rice (Eds.), *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press.

¹⁵⁴ Sandroni, P., Dotson, R. and Low, P.A. (2003). “Complex regional pain syndromes.” In T.S. Jensen, P.R. Wilson, and A.S.C. Rice (Eds.), *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press

¹⁵⁵ Walker L.S., Garber, J., and Greene, J.W. (1994). “Somatic complaints in pediatric patients: a prospective study of the role of negative life events, child social and academic competence, and parental somatic symptoms.” *Journal of Consulting and Clinical Psychology* 62(6), 1213-21

¹⁵⁶ Lampe, A., Solder, E., Ennemoser, A., Schubert, C., Rumpold, G. and Sollner, W. (2000). “Chronic pelvic pain and previous sexual abuse.” *Obstetrics & Gynecology* 96(6): 929-33

¹⁵⁷ *ibid.*, 395

¹⁵⁸ McGrath, P., Hetherington, R., and Finley, G.A. (2003). “Chronic pain in children.” In T.S. Jensen, P.R. Wilson, and A.S.C. Rice (Eds.), *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press, 644

Instead, the literature has come to advocate for a biopsychosocial approach that allows for a consideration of the biological, psychological, and social factors that co-produce pain, without engaging in mind-body dualism or reductionism.¹⁵⁹ This model provides an alternative to biomedical conceptions of the body as a collection of parts to be fixed. From a biopsychosocial perspective, the patient as a whole is taken into account in considering the onset and severity of pain. Furthermore, in terms of treatment, psychological and social aspects of pain are given equal weight to biological considerations, allowing for a holistic approach to pain management.

Pain Mechanisms in the Curriculum: Where Are We Now?

In the first half of this chapter, I described the history of the major theories used to explain the process through which we feel pain. I also expanded on the gate control theory and its importance for conceptualizing the mechanisms underlying chronic, intractable pain, in addition to providing a physiological explanation for the impact of psychosocial determinants of health on the perception of pain. In the second half of this chapter I proceed with an analysis of how the three medical programs studied here address pain mechanisms and manifestation in their curricula. Foundational knowledge of pain mechanisms shapes not only how students conceive of the onset and experience of pain, but also how they approach pain management. Therefore, in order to assess what students learn about pain mechanisms in the three medical programs studied here, I start by considering some of the progress made in pain curricula in recent years. Next, I look at how pain mechanisms are conceptualized and described in each curriculum. In doing so, I identify the strengths and weaknesses of each curriculum, noting overall that the curricula demonstrate a heavy focus on acute pain mechanisms, as well as contradictions within and among the curricula.

In analysing the primary pain sessions at each medical program, I noted that the majority of the objectives in these sessions focus on pain mechanisms and manifestation. In each of these sessions, a significant amount of content is dedicated to describing the neurophysiology of pain mechanisms, including nervous system pathways, receptors and nerve types, as well as points of intervention for pharmaceuticals. These topics occupy the bulk of the pain content at each school and are often revisited in multiple sessions. Overall, it was encouraging to see that all of the

¹⁵⁹ Pridmore, S. (2002), 3

curricula emphasize the distinction between nociceptive and neuropathic pain, while also defining pain as both a sensory and emotional experience, in accordance with the IASP definition of pain.

I was also surprised to find that each of the curricula studied here teach pain management through the lens of the gate control theory of pain. Writing about chronic pain education in 1983, Joseph Kotarba notes that most medical programs continued to teach the specificity theory of pain, despite agreement in the literature that the gate control theory explains more effectively the mechanisms behind chronic pain and the role of psychosocial factors in this process. He writes: “[Specificity theory] is still being taught in most medical schools (in some cases as the *only* theory of pain) and forms the basis for the discussion of pain in most medical textbooks.”¹⁶⁰ Kotarba attributes medical programs’ reluctance to accept the gate control theory of pain, in large part, on the persistence of the orthodox medical paradigm, arguing that “any normal science is basically *conservative* and tries to solve all puzzles or anomalies within its existing theoretical and methodological framework.”¹⁶¹

Given Kotarba’s critique of medical programs and their insistence on teaching specificity theory, I was surprised to find that each of the curricula studied here teaches the gate control theory as the dominant pain theory. In the primary session on pain mechanisms at School One, for instance, the summary of pain theories highlights gate control theory as the most comprehensive and accurate. This lecture also emphasizes the distinction between pain and nociception, a concept of particular importance in understanding the mechanisms underlying chronic pain. At School Two, the primary lectures on chronic and acute pain describe pain mechanisms in terms of gate control theory without explicitly mentioning it. In the primary session on chronic pain, for instance, pain mechanisms are described in terms of ascending and descending modulation, touching also on the role of the dorsal horn in conditions such as central sensitization. Meanwhile, School Three includes the gate control theory of pain in the primary lecture on pain management, with no mention of specificity or pattern theory.

In contrast to earlier insistence on describing pain through specificity theory, it seems that medical curricula have moved forward in embracing gate control theory in order to explicate pain mechanisms and manifestation. Describing pain mechanisms through this lens moves us away from conceptualizing pain as simply a matter of nociception towards an understanding of pain as

¹⁶⁰ Kotarba, J. (1983), 30

¹⁶¹ *ibid.*, 35

a multidimensional experience. While this is a significant improvement in pain education, upon deeper analysis I began to notice that in each curriculum gate control theory is described in such a way that the theory is largely made to fit within a biomedical model. In doing so, aspects of the gate control theory that align with biomedicine are emphasized and expanded upon, at the expense of details that challenge orthodox biomedical thought.

In developing the gate control theory, Melzack and Wall were concerned primarily with the puzzle of pain—why pain and injury are not always related, and what activities of the nervous system intervene between injury and pain perception such that this relationship is highly variable.¹⁶² In order to understand the significance and impact of the gate control theory, it is therefore essential to contextualize the development of this theory amidst the debate on specificity and pattern theory, as well as the puzzle of pain the theory attempts to resolve. To this end, the IASP Interprofessional Pain Curriculum includes the “historical development of pain theories and basis for current understanding of pain” as part of the recommended curriculum outline.¹⁶³ Despite the importance of this history, only one of the programs studied here, School One, includes any content on the historical development of pain theories. School Two and School Three, meanwhile, do not include any content related to the historical development of the gate control theory in their curricula.

The IASP Interprofessional Curriculum also lists a number of topics related to pain mechanisms that health professionals are expected to know. These include factors influencing neurophysiology such as genetics, age, sex, and ethnicity, as well as the “multiple dimensions of pain [including] physiological, sensory, affective, cognitive, behavioral, social/cultural/political.”¹⁶⁴ While all of the curricula studied here include some mention of psychosocial factors in their sessions on pain mechanisms, the discussion of such aspects is mostly focused on mental illness and limited to a single objective or a brief, vague summary at the end of the session. For instance, at School One, while most of the lectures on pain mechanisms are dedicated to discussing pain pathways, cortical areas, fibre types, and circuitry in the spinal dorsal horn, there is not a single mention of the numerous psychosocial determinants that play into this

¹⁶² Melzack, R. and Wall, P. (1996), 3

¹⁶³ International Association for the Study of Pain. (2012). “IASP Interprofessional Pain Curriculum Outline.” *International Association for the Study of Pain*, <http://www.iasp-pain.org/Education/CurriculumDetail.aspx?ItemNumber=2057>

¹⁶⁴ *ibid.*

process. The primary session on pain mechanisms briefly mentions “affective aspects” of pain, listing anxiety and depression as diseases that are often co-morbid with chronic pain. Beyond this, the importance of the puzzle of pain and the role of psychosocial determinants of health in solving this puzzle are not mentioned in any of the primary sessions on pain mechanisms.

At School Two, the lecture provided by the expert guest speaker on chronic pain does include numerous mentions of such factors, as well as the importance of understanding the patient’s pain history, mood, and quality of life. However, the other two lectures on pain management at School Two focus exclusively on biological factors in their discussion of pathophysiology. While these sessions do mention anxiety, helplessness, and demoralization as factors in the pathophysiology of pain, these variables are included in a linear diagram that traces the manifestation of acute pain from tissue injury to various pathologies. This sort of unidirectional pathway running from injury to pain is heavily criticized by Melzack and Wall, who write: “it is evident that even the most basic observations fail to support the proponents of the hard-wired, rigid structural systems... We need to consider the brain and the whole creature beyond the input.”¹⁶⁵

At School Three, the primary group session on pain includes numerous objectives related to nerve types and neuroanatomical pathways. This session includes only two objectives related to psychosocial determinants of health: one objective to describe psychological responses to chronic pain, and another to outline the affective components of nociception. Beyond this primary session, the pain content taught throughout the curriculum at School Three is the most successful, as a whole, at integrating psychological and social determinants of health in discussions of pain mechanisms. This content includes a discussion of cultural expectations of pain, as well as of the role of social and spiritual concerns in producing pain. Interestingly, this content is mostly taught within sessions on palliative and end-of-life care. I will further discuss the implications of this organization of pain content in Chapter Seven.

Contradictions and Limitations

The gate control theory of pain changed our understanding of pain mechanisms and manifestation not only due to Melzack and Wall’s conceptualization of the role of the brain and

¹⁶⁵ Melzack, R. and Wall, P. (1996), x

the spinal cord in this process. This theory also offered a means of moving beyond mind-body dualism, in order to take the complexity of the human experience of pain into account. If we divorce gate control theory from the context in which it was developed and the authors' concern that pain be understood as a unified stream of experience,¹⁶⁶ we ignore the underlying framework of the theory and the critical lens through which it allows us to conceptualize pain mechanisms. A description of pain mechanisms in terms of the gate control theory cannot be limited to a discussion of physiological processes with no consideration of psychosocial aspects of this experience. Instead, the gate control theory requires us to understand pain within the context of a wholly integrated nervous system in which psychosocial factors are not merely secondary considerations, but central to every stage of the process.¹⁶⁷

In analyzing the content on pain mechanisms in each of the curricula studied here, I have identified an overwhelming focus on aspects of the gate control theory that align with a biomedical understanding of pain and the body, such as descriptions of the neural system and biological functions of this system. While these physiological aspects are crucial to the process by which we feel pain, psychosocial factors are no less important in this system. The heavy focus on physiology and anatomy at the expense of psychosocial factors is of great concern, particularly given that the gate control theory was developed in large part in order to include these aspects of the experience of pain within a unified theory of pain mechanisms. In describing pain mechanisms, the primary sessions on pain at each program present pain as a symptom and a sign of "pathological disruption," or as the end result of a process that begins with tissue damage. In contrast, the literature insists on understanding acute pain as distinct from chronic pain, in order to conceive of chronic pain as a disease in its own right.¹⁶⁸ Furthermore, in many cases pain cannot be linked to any observable tissue damage or pathological "disruptions," such that the biomedical theory of pain mechanisms is inapplicable. In these and many other cases, a biomedical understanding of pain mechanisms cannot fully account for the complexity of the human experience of pain.

Having identified these limitations in each curriculum's objectives and content, I argue that in many ways the curricula pay lip service to gate control theory by mentioning the theory, and

¹⁶⁶ *ibid.*

¹⁶⁷ *ibid.*, 295

¹⁶⁸ Basbaum, A. and Jessell, T. (2000). "The perception of pain." In E.R. Kandel, J.H. Schwartz, T.M. Jessell (Eds.), *Principles of Neural Science 4th Edition*. New York: McGraw-Hill.

then proceeding to discount many of its central aspects. In doing so, the bulk of curricular content on pain mechanisms focuses on physiological pain pathways, fibre types, and circuitry—in brief, a conceptualization of pain mechanisms more closely aligned to specificity theory. Aspects of gate control theory that stretch beyond the limits of biomedicine to take into account psychosocial factors and other aspects of the theory—which are also some of the theory’s most important features—are glossed over or excluded entirely. Thus, gate control theory is made to fit within a conventional biomedical model that views the body as a machine and a collection of parts to be fixed, and pain as a breakdown in the machine to be repaired by physicians.

Ultimately, apart from the chronic pain lecture given at School Two, the sessions on pain mechanisms at each of the schools studied here only briefly mention the gate control theory before exclusively focusing on what Gatchel (1999) defines as “traditional descriptions of pain in purely physiological terms.”¹⁶⁹ One of the major contributions of gate control theory was the opportunity to move away from these reductionist biomedical explanations in order to acknowledge the role of psychosocial factors in influencing central control trigger mechanisms and other aspects of this complex process. Excluding these essential aspects of the gate control theory paints an incomplete picture for medical students who subsequently learn to diagnose and treat chronic pain on the basis of this understanding of pain mechanisms.

In addition to these limitations in content on pain mechanisms, I also noted some contradictions in the ways in which the curricula define acute and chronic pain and the mechanisms underlying each. At School One, the differences between acute and chronic pain are emphasized in several sessions. However, one of the primary lectures on pain mechanisms also describes acute and chronic pain in terms of a timeline that begins with tissue injury and nociception, and ends with chronic pain and disability. Although this same session (and others at School One) stresses the distinction between pain and nociception, this “timeline” represents chronic pain as a final step in a process that begins with acute pain.

This linear description of pain mechanisms also contradicts the emphasis in the literature on the distinction between chronic pain and acute pain, in order to acknowledge chronic pain as a disease and not merely a symptom. In discussing the importance of this new definition of chronic

¹⁶⁹ Gatchel, R.J. (1999). “Perspectives on Pain: A Historical Overview.” In R.J. Gatchel and D.C. Turk (Eds.) *Psychosocial Factors in Pain: Critical Perspectives*. New York: The Guilford Press, 7

pain, Morris (2003) writes: “Chronic pain differs in kind—not in degree—from acute pain, and neither holds its traditional status as a symptom.”¹⁷⁰ While some curricular content at School One makes this distinction in emphasizing that pain should not be equated to nociception, other sessions include diagrams tracing a “timeline” from acute to chronic pain. A similar diagram is presented in one of the lectures at School Two, showing a linear progression from acute injury to intractable pain and co-morbidities. These differing representations of pain might point to confusion within the literature and in clinical practice regarding how we define chronic pain. While the three curricula studied here, for instance, define pain as “chronic” on the basis of how long pain has persisted, this definition neglects other aspects such as whether or not pain is protective or maladaptive.¹⁷¹

While we have made significant improvements in incorporating gate control theory and certain psychosocial aspects into the pain curriculum, it is clear that there remains much work to be done. Beyond wondering how this content might be ameliorated and expanded upon, it is also worth asking ourselves to what extent the curriculum should focus on pain mechanisms and manifestation. In discussing content on pain mechanisms with a faculty member at one of the schools studied here, this doctor suggested that dedicating the bulk of pain content to pain mechanisms is not necessarily worthwhile. First, he argued that it is questionable whether enough is known about these mechanisms to make the content clinically relevant. Second, he also suggested that research on pain mechanisms is advancing so rapidly that the curricula cannot keep pace, and that the landscape of pain management will therefore have changed by the time medical students have graduated.

Currently, all three of the medical curricula studied here dedicate a significant portion, and often the largest portion, of curriculum content to discussing pain mechanisms. Whether this approach is effective or not is an interesting question. The primary chronic pain lecture at School Two, for instance, opens with an acknowledgment that students will not possibly have met all of the learning objectives after a two-hour lecture. Numerous other faculty members I have spoken with agree that two or three hours of pain-specific content is simply insufficient to teach medical

¹⁷⁰ Morris, D.B. (2003). “The challenges of pain and suffering.” In T.S. Jensen, P.R. Wilson, and A.S.C. Rice (Eds.), *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press

¹⁷¹ Woolf, C.J. (2010). “What is this thing called pain?” *Journal of Clinical Investigation* 120(11): 3742-3744

students everything they need to know about pain. It is worth considering, then, whether this limited time is used wisely in focusing mostly on pain mechanisms, particularly given some of the issues I have raised here. In this case, it might be more effective to consider the wider aims and goals of pain management, or at least to discuss the limits of clinical knowledge on pain mechanisms in these sessions.

Summary

In this chapter I examined the ways in which medical curricula teach students about pain mechanisms and manifestation. I began with a brief history of pain theories in order to expand upon some of the background I provided in Chapter Two. In doing so, I described the importance of gate control theory in changing our understanding of pain mechanisms, and some of the key aspects of this theory. Next, I presented the findings of my analysis of the three curricula studied here, noting that all three curricula teach the gate control theory as the primary pain theory. I also found that the curricula devote a large number of objectives to defining and outlining pain mechanisms.

While the emphasis on the gate control theory indicates a positive step forward from previous pain curricula, I also noted limitations in curricular content related to this theory. In particular, I argued that gate control theory is made to fit within an orthodox biomedical model such that the curricula emphasize aspects of the gate control theory that align with this model—including a focus on mechanical processes of circuitry, fibres, and receptors—while ignoring the importance of psychosocial determinants of health in this process. In addition to these limitations, I also identified several contradictions in the ways in which the curricula describe the mechanisms underlying chronic and acute pain. I finished with a consideration of the importance of devoting such a large amount of time to educating students about pain mechanisms, and how this content might be better designed and delivered.

In the next chapter, I shift my focus to curricular content on pharmacological and non-pharmacological pain management. In doing so, I describe the ways in which pain management is taught in the curriculum, and the major topics covered in this content. I also consider the large amount of content on pharmaceutical analgesics, and opioid medications in particular, as well as the ways in which these analgesics are discussed. Given the heavy stigmatization of chronic pain

and opioid use in treating pain, I critically assess the links between addiction and opioid use in all three curricula. I also discuss the importance of pain beliefs and perceptions of working with pain patients among medical students, and how these pain beliefs inform future clinical practice.

Chapter Six: Pain Management: Cuts, Chemicals, and Beyond

In the previous chapter I discussed the ways in which medical curricula teach undergraduate students about pain mechanisms and manifestation. The goal of this education, of course, is to prepare medical students to diagnose and treat pain in clinical practice. While it is essential to understand pain mechanisms and the process by which we come to feel pain, the purpose of such knowledge is ultimately to alleviate patients' pain and suffering. As Melzack and Wall put it, "If our theories do not lead eventually to effective treatment, they have failed no matter how elegant or compelling they may seem."¹⁷²

In this chapter, I discuss my analysis of pain management content in the three medical curricula studied here. I start by highlighting the central role of pharmacology in the curriculum, noting that there is very little content, if any, related to complementary and alternative therapeutic modalities. While pain management is largely taught in terms of prescribing pharmaceutical analgesics, I also found that the majority of this content focuses on opioid medications. Although all three curricula include multiple disclaimers emphasizing the limitations of treating chronic pain with opioids, the bulk of pain management content goes on to present opioids as the primary treatment for persistent pain, a contradiction that I attribute to the biomedical framework of the medical curriculum. I also analyze the discourse of addiction and deviance framing much of this content, as well as the implicit pain beliefs embedded in each curriculum.

Putting Theory to the Test: Treating Pain

In Chapter Two I described the history of pain theories, beginning with Descartes' "scientific" model of pain pathways published in 1641. Since the publication of Descartes' *Meditations on First Philosophy*, our understanding of pain mechanisms and manifestation has changed significantly. We know now, for instance, that pain is not solely a result of nociception, and that pain signals do not simply travel from the site of injury to the brain. Recent developments in pain research have also demonstrated that mind-body dualism, the paradigm in which Descartes' pain theory was framed, is reductionist and does not account for the full complexity of the

¹⁷² Melzack, R. and Wall, P.D. (1996), x

experience of pain and suffering. However, while our understanding of pain mechanisms has advanced considerably since the seventeenth century, the methods used primarily by physicians to treat chronic pain (pharmaceuticals and surgical interventions) are rooted in a biomedical approach more appropriate for treating acute pain.

Throughout much of human history, analgesics such as opium and henbane have been the treatment of choice for pain. The use of such plants continued until the nineteenth century, when the development of new analgesics allowed for increased control in dosage with fewer adverse effects. In 1809, a pharmacist in Germany isolated morphine from opium resin, which allowed for exact dosing of opioid analgesics.¹⁷³ Subsequent discoveries in the manufacturing of dyes led to the boom of the German drug industry, which dominated the synthetic drug and chemical field for over forty years.¹⁷⁴ By the end of the nineteenth century, four prototype analgesics were available: morphine, salicylic acid, phenazone, and phenacetin.¹⁷⁵ The development of new analgesics continued throughout the twentieth century, culminating with the creation of “aspirin-like drugs” in the late 1940s.¹⁷⁶ The gastro-intestinal adverse effects of these non-steroidal anti-inflammatories pushed researchers to develop newer analgesics with fewer adverse effects, leading eventually to the discovery of two cyclooxygenases, COX-1 and COX-2 in the late 1980s. This discovery once again changed the landscape of pain treatment, allowing for the widespread use of non-opioid analgesics with fewer adverse effects.¹⁷⁷

Today, pharmaceuticals remain the treatment of choice in treating pain. New anti-depressants, anti-inflammatories, and opioid drugs have been developed to treat pain with fewer adverse effects,¹⁷⁸ and new agents such as capsaicin and cannabinoids are being studied for their analgesic properties.¹⁷⁹ In addition to drugs, physicians and researchers have also experimented with surgical treatments for pain management in an attempt to sever the pain pathways described

¹⁷³ Brune, K. and Hinz, B. (2013). “History of Analgesics.” *Encyclopedia of Pain*, 1490-1496

¹⁷⁴ McTavish, J.R. (2004). *Pain and profits: the history of the headache and its remedies in America*. New Jersey: Rutgers University Press.

¹⁷⁵ *ibid.*, 1491

¹⁷⁶ *ibid.*, 1493

¹⁷⁷ Simmons, D.L., Botting, R.M., and Hla, T. (2004). “Cyclooxygenase Isozymes: The Biology of Prostaglandin Synthesis and Inhibition.” *Pharmacological Reviews* 56(3), 387-437

¹⁷⁸ *ibid.*, 123

¹⁷⁹ Kinnman, E., Sollevi, A. and Kristensen, J.D. (2003). “Novel agents and chronic pain.” In T.S. Jensen, P.R. Wilson, and A.S.C. Rice (Eds.), *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press, 261-71

by Descartes in his *Meditations*.¹⁸⁰ Since then, surgical options for pain treatment have expanded to include intrathecal drugs, electrical nerve stimulation, nerve ablation, decompression, and chemical sympathectomy.¹⁸¹ While surgery has proven essential in treating many acute conditions, surgical interventions rarely improve chronic non-malignant pain. Instead, surgical interventions can cause the re-occurrence of pain as well as severe adverse effects.¹⁸² Similarly, the effectiveness of pharmaceuticals in treating chronic pain has also been heavily debated. For instance, the safety of using pharmaceuticals designed for acute pain in treating long-term pain has been the focus of considerable deliberation, and the use of opioids in chronic pain management has been both supported¹⁸³ and criticized.¹⁸⁴

The use of pharmaceutical and surgical techniques in treating chronic pain is rooted in a biomedical approach that Armstrong and Armstrong (2010) refer to as the “cuts and chemicals” approach. This method of treating disease involves penetrating the body “physically by surgery and chemically by drugs.”¹⁸⁵ Rooted in a biomedical framework, this approach is also predicated on an understanding of the body as a collection of parts to be fixed. From this perspective, pain is an alarm that warns us of tissue damage within the body, and the role of the doctor is to find the source of injury and to cure any observable tissue damage. The parallels between this “cuts and chemicals” approach to pain management, and Descartes’ methodology in which pain pathways are mapped and, if necessary, severed, are evident. While this dualist model of pain mechanisms and management has persisted since the seventeenth century, we have since developed more sophisticated models and theories of pain that allow us to account for the complexity of the experience of pain. However, while pain theories and models have progressed considerably since the seventeenth century, our methods for treating pain have remained much the same. Although we know now that pain is much more complex than a mere warning sign indicating a malfunction

¹⁸⁰ Kotarba, J. (1983), 29

¹⁸¹ Koenig, H.G. (2003). *Chronic Pain: Biomedical and Spiritual Approaches*. New York: Haworth Pastoral Press, 185-199

¹⁸² *ibid.*, 185

¹⁸³ Watson, C.P.N., Watt-Watson, J. and Chipman, M. (2010) “The long-term safety and efficacy of opioids: A survey of 84 selected patients with intractable chronic noncancer pain.” *Pain Research and Management* 14(4): 213-17

¹⁸⁴ Rosenblatt, R.A. and Catlin, M. (2012). “Opioids for Chronic Pain: First Do No Harm.” *Annals of Family Medicine* 10(4), 300-1

¹⁸⁵ Armstrong, P. and Armstrong, H. (2010). *Wasting Away: the undermining of Canadian health care*. New York: Oxford University Press, 19

within the body, pain management still relies on a “cuts and chemicals” approach of seeking one cause for one symptom and attempting to treat this cause.

Although this approach is largely ineffective in adequately describing pain mechanisms or relieving persistent pain, the “cuts and chemicals” model remains the dominant approach to pain management. This persistence reflects Engel’s concern that biomedicine forces discrepant facts into its framework.¹⁸⁶ A biopsychosocial approach based on gate control theory, for instance, has been used to develop alternative and complementary therapies such as mindfulness meditation and cognitive-behavioural therapy. There is evidence that these treatment modalities are considerably more effective in providing long-term analgesia, and in improving sufferers’ overall quality of life.¹⁸⁷ Unfortunately, these complementary techniques for pain management are rarely used in medical practice, as physicians continue to rely on an ineffective “cuts and chemicals” approach to chronic pain that is at best unsuccessful, and at worst harmful.¹⁸⁸ Furthermore, while the IASP promotes an interprofessional approach to pain management, only one session in the three curricula studied here instructs students on when to refer patients for therapies such as physiotherapy. As we shall see in my assessment of the medical programs studied here, medical curricula also continue to teach pain management almost exclusively in terms of pharmacology (and in particular, the use of opioid analgesics) to the exclusion of other promising treatment modalities. The way in which medical programs insist on a biomedical approach to pain management may account, in some part, for medicine’s lag in adopting these new therapeutic modalities.

Pharmacology of Pain in the Medical Curriculum

Reflecting contemporary trends in pain management, the three medical curricula studied here emphasize pharmaceuticals as the treatment of choice for managing acute and chronic pain.

¹⁸⁶ Engel, G.L. (1977). “The need for a new medical model: a challenge for biomedicine.” *Science* 196(4286), 129-136

¹⁸⁷ Belgrade, M.J. (2003). “Alternative and Complementary Therapies.” In T.S. Jensen, P.R. Wilson, A.S.C. Rice (eds.) *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press.

¹⁸⁸ Henry, J.L. (2008). “The need for knowledge translation in chronic pain.” *Pain Research and Management* 13(6), 465-476

This is the case for sessions focused on multi-modal analgesia, lectures on pain mechanisms and management, and case studies on pain management. The bulk of these sessions on pain management is typically dedicated to three topics: the mechanisms of action underlying analgesics, guidelines for prescribing and dosing analgesics, and guidelines for prescribing opioids and screening for addiction. While each curriculum allows some space for objectives related to non-pharmaceutical pain treatments and complementary and alternative therapies, these are generally condensed into a single objective and often taught as part of the curriculum on end-of-life care. To demonstrate the pervasiveness of objectives related to pharmaceuticals, I will describe here the major sessions focused on pain management at each school, as well as the objectives related to pain management spread throughout each curriculum.

At School One, most of the content on pain management is taught during the pain week organized in students' second year. During this pain week, the primary session on pain management focuses on pharmacology of pain, and is organized by the university's faculty of pharmacy. It is interesting to note that the pain week at School One does not include any sessions focused, more generally, on "pain treatment" or "pain management," instead combining all aspects of pain management in a single lecture on pharmacology. The lecture itself focuses primarily on targets for analgesia and points of intervention, as well as on the pharmacology of opioid medications. The session begins with a brief description of the pain system, including a diagram indicating points of intervention for pharmaceuticals. This diagram presents the process of pain as beginning from "stimulus detection" by sensory nerve endings, although in many cases pain does not simply equal nociception, and often chronic pain cannot be linked to any tissue damage.

While this lecture on the pharmacology of pain includes a brief mention of the gate control theory of pain, the lecturer's use of the theory echoes my argument in the previous chapter that gate control theory is made to fit within a biomedical model for which one intervention is used to cure one symptom. In this case, pharmaceuticals such as acetaminophen and anti-convulsants are discussed for their potential to enhance dorsal horn inhibition or to increase excitation of inhibitory neurons. This biomedical lens excludes any consideration of the biopsychosocial aspects of pain management. For instance, although anti-depressants are mentioned as a means of acting on points of intervention within the physiological pain system, there is no discussion of how such drugs might also play a role in improving the patient's psychological wellbeing and therefore allowing for pain relief. While there is some mention of affective co-morbidities, these "affective" aspects

of pain are also framed in the context of discussing the mechanisms underlying the analgesic effects of such drugs as anti-depressants.

School One also includes a section on pain management in the primary session on pain mechanisms and manifestation. As in the case of the large group lecture on pharmacology, the objectives for this session mostly relate to points of intervention for pharmaceuticals. While physical treatments such as massage and physiotherapy are mentioned along with psychotherapy, these are briefly listed on a single slide with no further elaboration as to how or why such treatments work. There is also no description of how to assess whether a patient will benefit from these modalities or when patients should be referred to a specialist.

In addition to these sessions on pharmacology of pain and pain mechanisms, students at School One also attend a lecture on cannabinoids for pain. A large part of this lecture is dedicated to reviewing evidence for the use of cannabinoids in treating chronic pain, concluding that such use may be indicated for severe neuropathic pain in conditions such as multiple sclerosis. Given the adverse health effects of cannabis, as well as the existing research gaps, the lecturers advise that for most chronic pain sufferers medical cannabis is not indicated. Interestingly, while the benefits and limitations of cannabinoids are discussed at length in this session, the same discussion is not held in other sessions on pharmaceuticals such as opioids, acetaminophen, and non-steroidal anti-inflammatories. Finally, the lecture concludes with a description of the signs of cannabis use disorder, and provides clinical guidance in prescribing cannabinoids.

At School Two, most of the content on pain management also focuses almost exclusively on pharmaceuticals. As I discussed in chapter four, there are three primary sessions on pain management taught at School Two: one session on prescribing for persistent pain during students' third year, one lecture given by an expert guest lecturer on chronic pain in students' fourth year, and a session on anesthesiology also given during students' fourth year. The lecture provided by an expert guest speaker on chronic pain management differs significantly from other pain-specific sessions at School Two in its description of pain treatments beyond pharmaceuticals. This session is taught by a physician who focuses on chronic pain. While the session does mention pharmaceuticals and the role they play in pain management, the ideal treatment for chronic pain is described as including not only pharmaceuticals, but also physical and rehabilitative therapy, as well as psychological support. Although pharmaceuticals such as anti-depressants, anti-convulsants, and muscle relaxants are mentioned, the majority of the lecture focuses on non-

pharmacological treatments including exercise and mindfulness meditation. Opiates, meanwhile, are described as ineffective for conditions other than severe nociceptive and neuropathic pain, and students are cautioned to treat each opioid prescription as a trial.

The overall focus of this guest lecture regarding chronic pain management is notable, given that the other sessions on pain management at School Two almost exclusively present analgesia through the lens of pharmacology. The second session given to fourth year students on acute and chronic pain management focuses on “multi-modal analgesia,” describing such an approach as a means of using several analgesics with different mechanisms of action in order to lower the dose of each drug and therefore minimize adverse effects. This session focuses exclusively on pharmaceuticals, with a bulk of the content dedicated to prescribing opioid analgesics. This is unfortunate, given that the session’s emphasis on multi-modal analgesia offers an excellent opportunity to include other therapeutic modalities as part of an interprofessional approach to pain management. Similarly, the lecture given to third year students on pain management also focuses overwhelmingly on pharmaceuticals, particularly issues regarding dosing and prescribing opioid analgesics.

At School Three, pharmaceuticals also feature prominently in pain management content. The primary large group lecture on pain given to second year students, for instance, places significant emphasis on pharmacology, with nine objectives related to the pharmacological treatment of pain and a single objective pertaining to non-pharmacological pain treatments. Students are taught to describe the mechanisms, use, contraindications and adverse effects of different types of opioids, and to recognize the guidelines for opioid prescription. This session also teaches students to prescribe non-opioid analgesics, which include local anaesthetics, anti-depressants, acetaminophen, non-steroidal anti-inflammatories, anti-convulsants, and topical medications. Included in this content is a single objective to describe non-pharmacological pain treatments, such as surgical interventions, therapeutic massage, nerve stimulation, and acupuncture. In brief, while this lecture does include some content on pain management beyond pharmaceuticals, this is mostly restricted to physical modalities and surgical interventions in pain, with no mention of psychosocial treatments such as meditation or cognitive-behavioural therapy.

Interestingly, while throughout the curriculum at School Three there are some objectives focused on the non-pharmacological management of pain, these are primarily taught during a session on end-of-life care. School Three’s curriculum also includes one objective to describe

physical modalities of pain management such as massage therapy and acupuncture; this objective is met during a case-based, small group workshop on patient encounters. Otherwise, the majority of pain management objectives in the curriculum pertain to pharmacological treatments, covering such topics as mechanisms of action, target organs, major adverse effects, and contraindications of these drugs.

Opioids, Opioids, and More Opioids

In analysing the pain management content in all three curricula, I was taken aback by the many objectives pertaining to pharmacological treatments, as well as the lack of content on non-pharmacological pain management. Given prior research and my review of the literature, I was aware that pharmaceuticals play a large role in pain management, despite the fact that the effectiveness and safety of such drugs is debated.¹⁸⁹ In addition to the emphasis on pharmaceuticals in the curriculum, I also noted a large amount of content related to opioid medications and addiction. Opioids refer to all substances, both natural and synthetic, that bind to opioid receptors, including antagonists.¹⁹⁰ Opioids are largely used as analgesics, particularly in cases of acute pain, chronic cancer pain, and palliative care. However, their use is both controversial and stigmatized, due not only to side-effects and issues of safety,¹⁹¹ but also the concern that dependence, tolerance, and addiction can arise from prolonged use.¹⁹² Opioid use for chronic pain can also result in opioid-induced hyperalgesia, which is of particular concern if doctors are not trained in titration and

¹⁸⁹ Koenig, H.G. (2003) *Chronic Pain: Biomedical and Spiritual Approaches*. New York: The Haworth Pastoral Press, 123

¹⁹⁰ Ogura, T. and Egan, T.D. (2013). "Opioid Agonists and Antagonists." In H.C. Hemmings, T.D. Egan (Eds.), *Pharmacology and Physiology for Anesthesia: Foundations and Clinical Application*. Philadelphia: Saunders.

¹⁹¹ Watson, C.P.N., Watt-Watson, J., and Chipman, M. (2010). "The long-term safety and efficacy of opioids: A survey of 84 selected patients with intractable chronic noncancer pain." *Pain Research and Management* 15(4), 213

¹⁹² Tetrault, J.M. and Butner, J.L. (2015). "Non-Medical Prescription Opioid Use and Prescription Opioid Use Disorder: A Review." *Yale Journal of Biology and Medicine* 88(3), 227-233

rotation of opioids.^{193,194} In contrast to these concerns, others argue that opioids are underutilized in clinical practice due to physicians' opiophobia, such that chronic pain goes largely undertreated or untreated.¹⁹⁵

Given that opioid use for chronic non-cancer pain is heavily contested, curricular content related to opioid analgesics has also been the object of considerable scrutiny. Morley-Forster et al. (2013), for instance, found that only 30% of US medical schools require undergraduate instruction in pain management, opioid prescribing, and addiction medicine.¹⁹⁶ The authors recommend that undergraduate medical students receive clinical guidance under the mentorship of experienced residents, and that students learn to recognize when it is time to refer a patient to a pain specialist.¹⁹⁷ Similarly, multiple studies have considered the benefits of teaching content related to opioid medications in the context of palliative care, finding that a palliative care curriculum can improve medical residents' opioid prescribing practices.¹⁹⁸

In addition to concerns regarding what medical students learn about prescribing opioid analgesics, the development and delivery of this content has also been investigated. Highlighting the issue of industry funding and influence in pharmacological content, Persaud (2013) investigated pain management content at a Canadian undergraduate medical school. The author found that the university centre organizing pain sessions received over \$500 000 in funding from various sources, including pharmaceutical companies that sell opioid analgesics such as oxycodone.¹⁹⁹ In terms of the lectures on pain management, these sessions and the accompanying

¹⁹³ Silverman, S. (2009). "Opioid Induced Hyperalgesia: Clinical Implications for the Pain Practitioner." *Pain Physician* 12: 679-684

¹⁹⁴ Lee, M., Silverman, S., Hansen, H., Patel, V., and Manchikanti, L. (2011). "A Comprehensive Review of Opioid-Induced Hyperalgesia." *Pain Physician* 14: 145-161

¹⁹⁵ Moulin, D.E., Clark, A.J., Speechley, M., and Morley-Forster, P.K. (2002). "Chronic pain in Canada—Prevalence, treatment, impact and the role of opioid analgesia." In *Pain Research and Management* 7(4), 184

¹⁹⁶ Morley-Forster, P.K., Pergolizzi, J.V., Taylor Jr., R., Axford-Gatley, R.A., and Sellers, E.M. (2013). "Mitigating the risk of opioid abuse through a balanced undergraduate pain medicine curriculum." *Journal of Pain Research* 6, 791-801

¹⁹⁷ *ibid.*, 801

¹⁹⁸ Ury, W.A., Rahn, M., Tolentino, V., Pignotti, M.G., Yoon, J., McKegney, P. and Sulmasy, D.P. (2002). "Can a Pain Management and Palliative Care Curriculum Improve the Opioid Prescribing Practices of Medical Residents?" *Journal of General Internal Medicine* 17(8): 625-631

¹⁹⁹ Persaud, N. (2013). "Questionable content of an industry-supported medical school lecture series: a case study." *Journal of Medical Ethics*, 2

handbook identified oxycodone as a weak opioid, and included a quote describing “strong evidence that opioids relieve chronic neuropathic and nociceptive pains” from a review article that does not contain the cited sentence.²⁰⁰ Furthermore, the guest speaker’s conflict of interest was not disclosed in the course manual or the lecture notes. While industry involvement should be carefully scrutinized in all cases, the author notes that this influence is particularly risky when teaching controversial content on pharmaceuticals and opioids at the undergraduate level, given the impact this education has on students’ beliefs and practices.²⁰¹

In light of these controversial practices, as well as debates on the appropriateness of treating chronic pain with opioids, curricular content on opioid analgesics must be carefully thought through. The development of content on opioid medications should consider not only the information students receive on dosing and prescribing guidelines, but also the pain beliefs framing this content. I use the term “pain beliefs” here to refer to physicians’ attitudes towards pain, including expectations about working with pain patients²⁰² and the lens through which physicians understand and treat pain.²⁰³ While pain theories influence the ways in which physicians diagnose and treat chronic pain, these beliefs can be shaped by the pain education medical students receive.²⁰⁴ In Chapter Four, I discussed the importance of teaching pain management as a cognitive, emotional, and ethical experience. Given that chronic pain is a stigmatized condition and that the use of opioids in treating pain is often framed within the language of addiction and aberrant behaviour, it is particularly important that curricular content related to opioids extend beyond prescribing and dosing guidelines to include discussions that allow students to reflect on their own perspectives regarding chronic pain and opioid medications.

²⁰⁰ *ibid.*

²⁰¹ Sierles, F.S., Brodkey, A.C., Cleary, L.M., McCurdy, F.A., Mintz, M., Frank, J., Lynn, D.J., Chao, J., Morgenstern, B.Z., Shore, W., and Woodard, J.L. (2005). “Medical students’ exposure to and attitudes about drug company interactions: a national survey.” *The Journal of the American Medical Association* 7;294(9): 1034-42

²⁰² Wilson, J.F., Brockopp, G.W., Kryst, S., Steger, H. and Witt, W.O. (1992). “Medical students’ attitudes toward pain before and after a brief course on pain.” *Pain* 50, 252

²⁰³ Sit, R.W., Yip, B.H., Chan, D.C. and Wong, S.Y. (2015). “Primary care physicians’ attitudes and beliefs towards chronic low back pain: an Asian study.” *PLoS One* 10(1), 5

²⁰⁴ Wilson, J.F. et al. (1992), 255

The use of opioid analgesics in treating chronic pain is often framed in a manner that is stigmatizing and opiophobic.²⁰⁵ On the one hand, physicians' hesitation to prescribe opioids may be due to their uncertainty regarding dosing guidelines, opioid conversions and maintenance, as well as concerns regarding what is perceived as the "prescription opioid crisis."²⁰⁶ Others argue that physicians' opiophobia is unfounded or exaggerated, and that reluctance to prescribe opioids for chronic pain is a barrier to treatment rather than a safeguard against overprescribing.^{207,208} In light of these concerns, there has been renewed interest in increasing pain management and addictions content in medical education.²⁰⁹ While no doubt it is essential that students learn how to prescribe, dose, and convert opioids, as Persaud (2013) and others demonstrate, it is equally important to consider who develops and funds these sessions and how content is delivered. The ways in which opioid use for chronic pain is framed, and the pain assumptions implicit in this content, are equally essential aspects of the medical curriculum. In light of the importance of these pain assumptions and framing beliefs, I analyzed the three curricula studied here not only to assess how much medical students learn about prescribing opioids for chronic pain, but also how this content is framed and delivered.

It is interesting to note that when I contacted the medical programs studied here requesting access to curricular pain content, two of the programs included content regarding opioids and addiction in the information they provided me. For instance, in a spreadsheet listing the total pain-related objectives in the undergraduate curriculum, it was clear that School Three had included the terms "opioid" and "addiction" in their search. While I had not requested information regarding this content or mentioned these search terms in my request, the spreadsheet included objectives

²⁰⁵ Shah, S. and Diwan, S. (2010). "Methadone: Does Stigma Play a Role as a Barrier to Treatment of Chronic Pain?" *Pain Physician* 13, 289-293

²⁰⁶ Dhalla, I.A., Persaud, N. and Juurlink, D.N. (2011). "Facing up to the prescription opioid crisis." *British Medical Journal* 343:d5142

²⁰⁷ Moulin, D.E., Clark, A.J., Speechley, M., and Morley-Forster, P.K. (2002). "Chronic pain in Canada—Prevalence, treatment, impact and the role of opioid analgesia." In *Pain Research and Management* 7(4), 183

²⁰⁸ Clarke, H. and Katz, J. (Sept 26 2016). "No quick fix to society's opioid crisis." *The Toronto Star*. <https://www.thestar.com/opinion/commentary/2016/09/26/no-quick-fix-to-societys-opioid-crisis.html>

²⁰⁹ Canadian Centre on Substance Abuse. (2012). "Addressing Prescription Drug Misuse in Canada: National Dialogue Summary Report." <http://www.ccsa.ca/Resource%20Library/2012-Prescription-Drug-Misuse-in-Canada%E2%80%93Summary-Report-en.pdf>

taught during a course on substance dependency and abuse, as well as other case-based small group sessions focused on issues of addiction without any pain-related content. Similarly, in early discussions with an educational developer from School Two, in her description of the organization of pain content in the curriculum she listed multiple objectives related to opioid use and addiction. Many of these sessions, such as a course on street health and a learning event on physician addiction, do not include any pain content and are not pain-specific courses.

The IASP Interprofessional Pain Curriculum includes only one objective related to opioids (under the section “pharmacological methods”), and three objectives related to addiction (under “ethics,” “caregiver issues” and “health professional issues”). Substance abuse is also included in two objectives under the subtopics “substance abuse issues” and “pain in special populations.” In contrast, the three medical schools studied here include a significant amount of content related to opioids, substance abuse and addiction in sessions on pain management. Schools One’s pain week, for instance, includes content on opioid medications in nearly all of its sessions. In the lecture on pharmacology of pain, one-third of the content focuses on opioids, and the lecture finishes with a lengthy discussion on screening for addiction. In a subsequent session on mental illness and pain, opioids are described as the “standard treatment” for pain, although students are warned in this same session that opioids “don’t work” in treating most chronic pain conditions. Furthermore, this session notes higher rates of opioid misuse among patients with depression and anxiety, and cautions that patients with depression and anxiety experience reduced pain relief from opioids. In its primary case study, this lecture describes the presenting patient as incapable of working due to addiction to alcohol and opiates. Opioids are also mentioned in sessions on pain mechanisms, chronic cancer pain, pediatric pain, and dried cannabis for pain.

At School Two, opioids and addiction are mentioned in all four of the primary sessions on pain. The third year clerkship preparation course on pain and prescribing is organized primarily around cases that students work on in small groups, and most of these cases feature situations in which students must determine which opioids to prescribe and how to dose patients’ medication. For faculty and staff in the medical program, this course is colloquially referred to as “how not to kill people with opioids.” To this end, the content mostly focuses on prescribing opioids correctly, how to initiate opioid therapy, converting from oral opioids and from short- to long-acting opioids, and using opioid medications for neuropathic pain. While the session is generally designed to

provide students with an opportunity to apply what they have learned about prescribing for persistent pain, it has largely been developed as a session focused on prescribing opioids.

These principles are re-visited in students' fourth year during a session focused on readiness for residency, which is informally described within the program as "how to approach a nightmare list of medication." The session consists of multiple case studies in which students are asked what they would prescribe for patients with "nightmare lists" of multiple analgesic medications. These sessions emphasize the importance of calculating dosing and converting opioids, titration, and the practical aspects of prescribing such drugs. Some of the challenges discussed include severe pain that is unresponsive to opioids, opioid tolerant patients, drug-related aberrant behaviour, co-morbidities, and chronic pain.

In their fourth year, students also take two mandatory courses on pain management: a session on chronic pain delivered by an expert guest speaker, and a complementary session organized by the anesthesiology department. I mentioned earlier in this chapter that while the complementary session is dedicated to discussing multi-modal analgesia, most of the lecture focuses on pharmacology for pain. This session also includes a large amount of content related to opioid medications, as multi-modal analgesia is seen as an opportunity to reduce the adverse effects of opioids by using other drugs at low dosages. This session describes opioids as the "drug of choice for moderate to severe pain," while criticizing the fact that opioids are often the only drug ordered for chronic pain. The lecture given by an expert guest speaker on chronic pain also provides some information regarding opioid medications. One of the stated objectives of this session is to promote safer opioid prescribing practices, but also familiarity with non-opioid medication. In describing the use of opioid medications for chronic pain, the lecturer cautions that opioids should only be used in cases of severe neuropathic pain, and highlights the links between high rates of opioid prescriptions and opioid-related deaths. Students are also taught guidelines for screening for substance abuse and addiction.

The primary pain management session at School Three, taught during students' second year, includes seven objectives related to opioid medications. These objectives include listing endogenous opioids, describing the mechanisms of action of opioids, recognizing "narcotics guidelines," describing routes of administration for opioids, listing the most frequent adverse effects of opioid medications, and describing opioid-induced hyperalgesia. Under the subtopic "pharmacological treatment" of pain, 77% of the objectives are related to opioid medications, with

the remaining content focused on describing “non-opioid analgesics” and topical medications for the treatment of pain. This lecture also includes content on addiction, tolerance, and physical dependence. Students learn how to identify medication overuse syndrome, and how to differentiate between various treatments for pain in regards to efficacy, duration of effect, tolerance, dependence, and potential for abuse.

In addition to this primary lecture on pain management, several other sessions throughout the curriculum include objectives related to opioid analgesics for pain management. In a session on substance abuse and dependency, for instance, students learn how to prevent the abuse of prescription drugs while ensuring that pain medications are available to those who need them. In the primary session on end-of-life care, students learn the mechanisms of action, use, contraindications and adverse effects of opioid analgesics, while also learning to describe the different types of opiate receptors and the role of the glial cell in developing tolerance to narcotics. Content on opioid medications is also included in several case-based, small group patient encounters, as well as a session on pain and addiction.

This overview of all three curricula allows some insight into the substantial amount of curricular content dedicated to opioid medications. In analyzing each program’s content, it became apparent that all three of the curricula followed a similar trend in discussing pain treatment. While all three curricula acknowledge the limits and dangers of treating pain with opioid medications, objectives related to opioid analgesics significantly outweigh curricular objectives on non-opioid medications and other therapies. At each school, the primary session(s) on pain management cite multiple studies indicating that opioids should only be used in cases of moderate to severe neuropathic pain, and that they should only be prescribed as part of a multi-modal, interdisciplinary pain management plan.²¹⁰ Having emphasized these limitations, each lecture proceeds to dedicate most of the session to discussing opioids and how to prescribe these analgesics.

The abundance of opioid-related content in each curriculum is concerning not only due to the quantity of time spent discussing these topics at the expense of teaching other, more effective pain management modalities, but also the language in which pain treatment and opioid use are framed. In each curriculum, opioid analgesics are heavily linked to the treatment of intractable, persistent pain, and this use is described in terms of addiction and drug-seeking behaviour. In the

²¹⁰ Kalso, E., Edwards, J.E., Moore, R.A., and McQuay, H.J. (2004). “Opioids in chronic non-cancer pain: systematic review of efficacy and safety.” *Pain* 112(3): 372-80

next section, I will analyze the “discourse of pain” in the curriculum, arguing that pain treatment is frequently framed in a discourse of addiction, aberrant behaviours, and difficult patients, and that this discourse is rooted in and contributes to the stigmatization of chronic pain.

Discourse of Pain in the Curriculum

That the experience of chronic pain is constructed through discourse is not a new concept: numerous studies have described the ways in which chronic pain is gendered,²¹¹ racialized,²¹² and heavily stigmatized.²¹³ Others have proposed that there is an innate propensity towards disbelief when faced with others’ chronic pain, due perhaps to the biomedical expectation that those who are sick should be cured, and that those who remain ill simply do not want to be healed, particularly in the case of invisible illness.²¹⁴ In referencing these biomedical expectations of illness, Jackson (2005) argues that chronic pain represents a transgression of the biomedical divide between mind and body, thereby “confounding the codes of morality surrounding health and illness” and social expectations governing sickness.²¹⁵ In a similar vein, Robinson et al. (2013) describe chronic pain as constructed within a “moral discourse” in which morality is “concerned with principles of right and wrong behaviour.”²¹⁶ The legitimacy of persistent pain is often scrutinized under the suspicion that sufferers engage in “immoral” behaviours such as malingering, exaggerating or lying about pain. In order to manage this stigma, patients must present themselves as actively seeking a cure for their pain, by engaging in “moral” behaviours such as taking medication as prescribed.

This discourse of chronic pain and stigmatization creates a binary between “good” and “bad” pain patients. “Good” patients present with acute pain for which a single cause can be found

²¹¹ Grace, V.M. and MacBride-Stewart, S. (2007). “‘Women get this:’ gendered meanings of chronic pelvic pain.” In *Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine* 11(1): 47-67

²¹² Green, C.R., Baker, T.A., Sato, Y., Washington, T.L. and Smith, E.M. (2003). “Race and chronic pain: a comparative study of young black and white Americans presenting for management.” *The Journal of Pain* 4(4): 176-83

²¹³ Jackson, J.E. (2005). “Stigma, liminality, and chronic pain: Mind-body borderlands.” *American Ethnologist* 32(3): 332-353

²¹⁴ Watt-Watson, J. et al. (2013), 31

²¹⁵ *ibid.*, 334

²¹⁶ Robinson, K., Kennedy, N. and Harmon, D. (2013). “Constructing the experience of chronic pain through discourse.” *Scandinavian Journal of Occupational Therapy* 20(2): 93-100

and which can be easily treated and cured. Their pain can be managed with a straightforward treatment plan, and they follow this plan dutifully. If their treatment plan includes opioid medications, these medications work quickly and effectively, and the patient ceases taking opioids once their condition has been cured. In contrast, a “bad” patient is one whose pain cannot be linked to any one cause, or for which a cause cannot be found. Their pain does not respond to most analgesics, and therefore requires a complicated treatment regime which often includes opioids. “Bad” chronic pain patients display what are considered to be aberrant behaviours: running out of medication early, unsanctioned dose increases, insisting that their pain is only effectively treated by opioids (or a certain type of opioid), and getting prescriptions from multiple prescribers. “Bad” patients may also have existing substance abuse and addiction issues, or opioid tolerance or unresponsiveness.

It has been demonstrated that social stigmatization of chronic pain, and the division of pain patients into “good” or “bad,” affects physicians’ pain beliefs and the ways in which they manage pain. For instance, physicians’ pre-existing assumptions regarding opioid medications influence the rates at which they prescribe opioids for chronic pain, particularly in the case of physicians who feel dissatisfied with their knowledge of opioid prescribing guidelines.²¹⁷ Research has also found that physicians’ pain assumptions can be shaped through medical education, such that they develop more positive perspectives and attitudes towards treating chronic pain.²¹⁸ Positive pain beliefs include confidence in working with pain patients, the expectation that working with such patients is rewarding and worthwhile, and the understanding that patients’ pain is real and not imaginary or the result of malingering. Pain education plays a crucial role in promoting positive pain beliefs, and in turn, improving the ways in which physicians manage patients’ pain.

In Chapter Four I described the importance of teaching pain content not only with the goal of training students to develop clinical skills, but also in order to foster an emotional, developmental, spiritual, ethical, and cultural experience of pain and pain management. Pain education requires not only that guidelines regarding dosing, prescribing, and screening for addiction be met; the pain curriculum must also take into account the development of students’

²¹⁷ Hutchinson, K., Moreland, A.M.E., Williams, A.C.C., Weinman, J. and Horne, R. (2007). “Exploring beliefs and practice of opioid prescribing for persistent non-cancer pain by general practitioners.” *European Journal of Pain* 11: 93-8

²¹⁸ Wilson, J.F., Brockopp, G.W., Kryst, S., Steger, H. and Witt, W.O. (1992). “Medical students’ attitudes toward pain before and after a brief course on pain.” *Pain* 50(1992): 251-256

understanding of pain in order to prepare them for the complex task of working with pain patients. From a biopsychosocial perspective, pain is understood to be co-produced by biological, psychological, and social factors. Learning how to treat the biological features of pain therefore allows physicians to manage only one small aspect of the patient's "total pain," which can include anger, loss of faith, fear of suffering, mental illness, and a plethora of other factors.²¹⁹ In this sense, a pain management curriculum focused almost exclusively on pharmacology of pain, as in the case of the three medical curricula studied here, inadequately prepares students for the task of managing patients' pain effectively. Furthermore, evidence-informed pain education also requires careful consideration of the discourse of pain in which curricular content is embedded, as well as the language used to describe pain patients.

In order to assess the ways in which the curricula frame chronic pain in relation to addiction, I analyzed the language used to describe people suffering from chronic pain and using opioids for their pain. Given that chronic pain is heavily stigmatized, medical curricula have a responsibility to challenge this stigma and to encourage positive attitudes towards pain patients in medical students. This responsibility makes the language I found in each curriculum particularly unfortunate. In the session on pain developed to prepare students for residency at School Two, for instance, a significant portion of the session is dedicated to learning how to work with patients described as "difficult:" patients who have two or more chronically painful conditions, and who are "demanding" in seeking relief from their pain. In this session, students are also taught how to help someone who "won't do what [the doctors] say," implying that these patients seek health care for reasons other than relieving their pain or are unwilling to "help themselves."

In their third year, students at School Two are also presented with a number of case studies in order to prepare them to work with "difficult" patients. These case studies include a woman with fibromyalgia who insists that only opioids relieve her pain, and another woman with fibromyalgia who threatens to commit suicide if she is not prescribed opioids. At the end of this session, students are asked if they are "overwhelmed yet" at the possibility of managing such patients. Chronic pain patients are also described as "overwhelming" in the session on chronic pain management in students' fourth year. The case study used in this session features a woman aggressively demanding an early refill of her opioids, and who insists that opioids "take the edge

²¹⁹ Mehta, A. (2008). "Understanding the Concept of 'Total Pain': A Prerequisite for Pain Control." *Journal of Hospice & Palliative Nursing* 10(1): 26-32

off” her pain. At School Three, content on opioids includes the term “narcotics,” a term generally avoided as it is vague and has pejorative implications.²²⁰ This term is used not only in a primary session on pain and pain management, but also in other pain-related objectives throughout the curriculum.

Descriptions of pain patients as “difficult” or “overwhelming” reinforce negative beliefs that these patients are difficult to work with, and place blame for the challenging nature of their condition on the patient. While it was beyond the scope of this thesis, it would be interesting to compare curricular content on other complex diseases, and to assess whether patients diagnosed with challenging diseases are similarly positioned as difficult patients unwilling to accept help. I am not arguing here that physicians do not have to deal with patients who “challenge” them in certain ways, or that it is unimportant to screen for addiction or substance abuse in prescribing opioids. Unfortunately, opioids do have the potential for causing addiction or physical dependence, and it is certainly true that the rates of death caused by prescription opioids have increased dramatically since 2004.²²¹

However, it is also the case that some physicians demonstrate excessive opiophobia such that chronic pain often goes undertreated or untreated.²²² Care must be taken to ensure that medical curricula provide appropriate guidelines for the safe and effective use of opioid medications, while also ensuring that patients who require these analgesics have access without fear of stigma or judgment. In order to encourage this sense of responsibility and compassion in medical students, it is imperative that curricula foster positive pain beliefs in which patients are not blamed for the chronic pain with which they live, and in which addiction is understood as a disease rather than a lapse of morality. Linking chronic pain to addiction in session titles, objectives, and content risks framing chronic pain in terms of addiction. Likewise, describing addiction in terms of “aberrant behaviours” and “difficult patients” casts addiction as a result of deviancy and non-compliance. A

²²⁰ “Junk the Term Narcotics—Call Them Opioids.” (June 2012). *Practical Pain Management*, <http://www.practicalpainmanagement.com/treatments/pharmacological/opioids/junk-term-narcotics-call-them-opioids>

²²¹ Canadian Centre on Substance Abuse. (2015). “Prescription Opioids.” <http://www.ccsa.ca/Resource%20Library/CCSA-Canadian-Drug-Summary-Prescription-Opioids-2015-en.pdf>

²²² Moulin, D.E., Clark, A.J., Speechley, M., and Morley-Forster, P.K. (2002). “Chronic pain in Canada—Prevalence, treatment, impact and the role of opioid analgesia.” In *Pain Research and Management* 7(4): 179-184

balanced curriculum that presents both the benefits and limitations of opioid use for pain management, on the other hand, has been shown to promote safer prescribing practices and less opiophobia among physicians.²²³

Summary

In this chapter I analyzed the pain management content of the three medical curricula studied here. Based on the written curricula I noted, first, that pain management is overwhelmingly taught as pharmacology of pain, with a strong emphasis on the mechanisms of action of these drugs. In contrast, there is minimal content on complementary or alternative treatment modalities, and when these are present, they are generally listed without any additional information, or guidelines on referral. In contrast, I found that all three curricula are saturated in content on opioid medications and addiction. Having identified these trends, I also focused on the “discourse of pain” framing content on pain management in the curriculum. I found that chronic pain management is often taught using language such as “overwhelming” and referencing “difficult” patients, and that chronic pain patients are linked to addiction and aberrant behaviour in each curriculum.

In identifying the ways in which chronic pain is framed and discussed in the medical curriculum, I argued that this language inappropriately encourages negative pain assumptions in physicians. In contrast to this discourse centered around morality and aberrant behaviours, there are many other ways in which chronic pain could be framed in the medical curriculum. In the next chapter, I discuss some of these possibilities, suggesting that an understanding of chronic pain as suffering, or based on the concept of “total pain,” would allow for a biopsychosocial approach that takes into account the spiritual, emotional, cognitive, and cultural aspects of pain. To this end, I analyze the ways in which a biopsychosocial approach is used to discuss chronic pain in the curriculum. I also analyze content related to social determinants of health in the curricula, identifying a lack of such content in case studies and lecture materials. Finally, I finish by discussing the success of the palliative care curriculum in teaching pain from a biopsychosocial

²²³ Morley-Forster, P.K., Pergolizzi, J.V., Taylor Jr., R., Axford-Gatley, R.A., and Sellers, E.M. (2013). “Mitigating the risk of opioid abuse through a balanced undergraduate pain medicine curriculum.” *Journal of Pain Research* 6, 791-801

perspective, noting that palliative content in all three programs utilizes concepts such as “total pain” and pain as suffering.

Chapter Seven: Biopsychosocial Content in the Curriculum

In the previous chapters I described the international, national, and institutional contexts in which pain content for undergraduate medical curricula is developed. Having established these contexts, I moved on to analyze the pain content of the three undergraduate medical curricula studied here. In particular, I focused on what the curricula indicate medical students learn in terms of pain theories, pain mechanisms and manifestation, as well as pain management. In doing so, I have identified some of the ways in which undergraduate medical students are taught to approach, diagnose, and treat pain. On the basis of this analysis, I argued that pain content is largely taught from a biomedical approach that the pain literature suggests is inadequate and ineffective in managing chronic pain. In challenging this approach, I drew on the work of Romano and Engel, as well as contemporary literature on pain management, and proposed that a biopsychosocial approach is imperative in the effective management of intractable pain.

In this chapter, I revisit these concepts in order to assess the integration of biopsychosocial concepts into the medical curriculum, and in particular, whether students learn about the ways in which psychological and social determinants of health impact the onset, duration, and experience of pain. I begin by describing the biopsychosocial pain content in each curriculum, noting that most of this content is limited to vague descriptions of the relationship between mental illness and chronic pain with little mention of social determinants of health. In contrast to the biomedical perspective that pervades most of the curriculum, I found that sessions on palliative and end-of-life care take a decidedly biopsychosocial approach to pain management. These sessions frame pain within the experience of “total pain” and suffering and encourage students to view pain as more than simply physical discomfort. In support of this approach, I argue that medical curricula could benefit greatly from extending palliative care as an approach to treating pain and suffering at all life stages, while also borrowing concepts and frameworks from this perspective.

Pain Education from a Biopsychosocial Perspective

As I described in Chapter Two, the biopsychosocial approach to pain is one in which biological, psychological, and social determinants of health are understood to be co-producers in the onset and experience of pain. Derived from the work of George Engel and John Romano in the

1970s, the biopsychosocial approach has since been taken up by pain researchers and clinicians as an effective means of treating the concurrent factors resulting in chronic pain, for which a biomedical approach to diagnosis and treatment is ineffective. Waugh et al. (2014), for instance, note that “pain occurs in a social context,” and that interpersonal features such as stigma tend to lead to catastrophizing and a reduced sense of personal control, thus increasing overall pain.²²⁴ Furthermore, in reviewing the benefits of a biopsychosocial approach to chronic pain, Gatchel et al. (2007) found that this approach allows for a heuristic, interdisciplinary pain management strategy that acknowledges the role of stress, emotional disorders, and maladaptive conditions in the experience of pain.²²⁵

In addition to allowing for a clearer, more interdisciplinary understanding of chronic pain, the biopsychosocial model has also been used in the development of new approaches to pain management. Turk and Melzack’s (2011) *Handbook of Pain Assessment*, widely considered the most authoritative text on the subject, includes chapters on psychosocial assessment of pain beliefs and coping, assessment of couples and families with chronic pain, assessment of pain and health-related quality of life, and the importance of biopsychosocial screening before surgical intervention or opioid therapy.²²⁶ Others explore the potential of psychosocial pain treatments such as cognitive-behavioural therapy,²²⁷ family and couple therapy,²²⁸ and grief therapy.²²⁹ Similarly, an understanding of pain predicated on gate control theory and the role of psychosocial factors using the “gate” metaphor has led to the use of various complementary and alternative therapies in

²²⁴ Waugh, O.C., Byrne, D.G. and Nicholas, M.K. (2014). “Internalized Stigma in People Living with Chronic Pain.” *The Journal of Pain* 15(5): 550.e1-550.e10

²²⁵ Gatchel, R., et al. (2007). “The Biopsychosocial Approach to Chronic Pain: Scientific Advances and Future Directions.” *Psychological Bulletin* 133(4), 607

²²⁶ Turk, D.C. and Melzack, R. (2011). *Handbook of pain assessment (3rd Edition)*. New York: Guilford Press.

²²⁷ Linton, S.J. (1999). “Prevention with Special Reference to Chronic Musculoskeletal Disorders.” In R.J. Gatchel and D.C. Turk (Eds.) *Psychosocial Factors in Pain: Critical Perspectives*. New York: The Guilford Press.

²²⁸ Roy, R. (2008). *Psychosocial Interventions for Chronic Pain: In Search of Evidence*. New York: Springer, 43

²²⁹ *ibid.*, 94

chronic pain management, including physiotherapy,²³⁰ chiropractic and manual therapies, and acupuncture.²³¹

In the previous chapter I discussed the preponderance of content on pharmacology for pain in all three curricula, as well as the lack of content on other pain therapies. In this chapter I begin by identifying what biopsychosocial content, if any, is present in the curricula studied here. Given the importance of an interprofessional approach to pain management, I am also interested in whether students learn about complementary or alternative pain therapies, and when to refer patients for such treatments. Under the CanMEDS role of “Collaborator,” physicians are expected to understand the roles of others in a collaborative health care team. Furthermore, under the role of “Medical Expert,” physicians are also expected to understand the limits of their expertise, and to practice in collaboration with other health professionals. Given these core competencies, while physicians are not expected to administer all complementary and alternative treatments, they should be aware of these therapeutic modalities, when they are indicated, and when to refer patients for such treatments.

In all three of the curricula studied here, there was some mention of the psychosocial determinants of health in relation to the onset, duration, and development of pain. This mostly took the form of content on mental illness and co-morbidities such as anxiety and depression, and the role of these illnesses in either causing or resulting from chronic pain. At School One, the bulk of this content is presented in a session on chronic pain and mental illness in students’ second year. In this session, students learn about the ways in which mental illnesses such as anxiety and depression can cause or worsen pain, and how the presence of such illnesses affects pain management and the effectiveness of opioids in relieving pain. This session also includes strategies such as “addressing social determinants of health,” cognitive-behavioural therapy, and physical therapy, without providing any details as to what such therapies might entail or when they should be prescribed.

²³⁰ Wittink, H., Cohen, L.J., and Hoskins Michel, T. (2002). “Pain Rehabilitation: Physical Therapy Treatment.” In H. Wittink and T. Hoskins Michel (Eds.) *Chronic Pain Management for Physical Therapists (2nd Edition)*. Boston: Butterworth-Heinemann, 127-159

²³¹ Belgrade, M.J. (2003). “Alternative and Complementary Therapies.” In T.S. Jensen, P.R. Wilson, A.S.C. Rice (eds.) *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press.

Furthermore, this lecture on mental illness and chronic pain focuses almost exclusively on anxiety and depression, without delving into other psychosocial factors that influence the experience of chronic pain. Other sessions that mention psychosocial aspects of pain at School One, such as the lectures on pharmacology and pain mechanisms, also limit this content to a list of mental illnesses such as anxiety and depression, without providing any further detail as to how such factors should be taken into account in an effective pain management plan. The only exception in the curriculum at School One is a lecture on cancer pain which discusses the importance of recognizing pain as physical, psychological, social, and spiritual suffering. This lecture is the only session to mention the term “biopsychosocial” at School One, and to include psychosocial considerations such as age, gender, cultural membership, social roles, and language. The lecture also touches on “existential” suffering and the importance of considering patients’ spiritual pain and that of their caregivers and loved ones. The case studies examined in this lecture include not only “biological” considerations but also the social context in which the patient lives and the patient’s priorities. Finally, in discussing pain management strategies this session does not simply list the members of an interprofessional pain management team. Instead, the roles of each member are discussed at length, and students are taught when and how to include other health professionals in an interprofessional pain management strategy.

Content on psychosocial determinants of health in relation to pain management is equally limited in the undergraduate medical curriculum at School Two. The guest lecture on chronic pain organized in students’ fourth year does include some mentions of a biopsychosocial approach to pain, particularly in the case study around which the lecture is focused. In working on the case study students are advised to investigate the patient’s “pain narrative history,” as well as her mood, function and quality of life. Additionally, psychosocial factors such as childhood adversity are mentioned, and the session is very strong in its description of a number of complementary and alternative therapies, including exercise and mindfulness meditation. The ideal treatment for chronic non-cancer pain is described as one in which movement, psychological therapy, and medicine are incorporated. In contrast, the sessions on pain management organized by the anesthesiology department at School Two make very little mention of psychosocial aspects of pain. In some case studies patients are described as presenting with depression in addition to various types of chronic pain, and one of the “challenges” students are prepared for is the possibility of

patients with “psychiatric/psychological” issues in addition to pain. However, beyond these brief mentions psychosocial aspects of pain management are not otherwise discussed.

As pain content is fragmented throughout the curriculum at School Two, pain content in general required courses is occasionally discussed through a biopsychosocial lens. For instance, when the concept of chronic pain is first introduced in students’ first year, it is presented within the framework of “total suffering,” an important concept in biopsychosocial and palliative pain management. While pain is also mentioned within sessions on psychiatry, this is mostly in the context of addiction and substance abuse. Finally, in a session on geriatrics, oncology and palliative care in students’ second year, the importance of treating the “patient as a whole” is emphasized. In this session pain is taught through a palliative care perspective, with an emphasis on providing palliative pain management in a multidisciplinary team.

In the primary session on pain at School Three, there is little mention of psychosocial factors. The session’s focus is primarily on neurophysiology and pharmaceuticals, with only a single mention of “non-pharmacological treatments,” and these are mostly limited to physical modalities such as surgical interventions and transcutaneous electrical nerve stimulation. Psychological factors are also included in a single objective to describe “physiological and psychological” responses to chronic pain. Otherwise, the pain management objectives for this session are limited to pharmacology.

Beyond this primary session in students’ second year, pain content at School Three is also taught in several other general courses throughout the curriculum. While most of this content focuses on neurophysiology and pharmaceuticals, an interesting exception is a session on end-of-life care in students’ second year. In this lecture, students learn the role that “psychological, social, and spiritual concerns” play in producing the experience of pain at the end of life. Students are also introduced to the concept of “total pain,” as well as a variety of non-pharmacological therapies to manage pain at the end of life. In another session on pain and addiction in year three, students are taught to understand pain management in terms of function and activities of living instead of complete elimination of pain. Students also learn to take a multidisciplinary approach to pain management that includes complementary therapies.

Taken as a whole, I found that the three medical curricula studied here largely teach pain content from a biomedical approach in which the majority of curricular content focuses on neurophysiology of pain mechanisms, as well as managing pain with pharmaceuticals. However,

each curriculum also includes biopsychosocial concepts and theories to varying extents. While each primary pain session does mention psychosocial determinants of health in some capacity, this discussion is mostly restricted to discussing mental illness. It is undoubtedly important that medical students understand the impact of mental illnesses such as anxiety and depression on the onset and experience of pain, as well as the risk of developing a mental illness when suffering from prolonged pain. This relationship between mental illness and chronic pain has been well-documented,²³² and therefore it is encouraging to see mental illness integrated into primary pain sessions.

However, a consideration of psychosocial aspects of pain should not end with the discussion of mental illness. All three of the curricula restrict discussion of psychosocial factors almost entirely to mental illness, without considering the numerous social factors that shape the experience of pain. These include what Roy (2008) terms “social dislocations” such as unemployment, strained family relations, lack of social support, and other changes that affect one’s sense of self as well as one’s social roles and interpersonal relationships.²³³ Furthermore, aspects of one’s identity such as religion, sex, gender, and ethnicity influence pain perception and response to treatment. The impact of these psychosocial predictors on pain chronicity has been empirically demonstrated,²³⁴ and the mechanisms underlying this process are explained through Melzack and Wall’s gate control theory of pain.

Unfortunately, these social determinants of pain are rarely mentioned or described in detail in the medical curricula studied here. Interestingly, while factors such as gender and age are mentioned in the case studies at all three programs, the inclusion of such aspects tends to convey implicit negative pain beliefs. For instance, in the fourth year course on pain management at School Two, case studies on chronic pain disorders such as fibromyalgia include patients described as middle-aged or young women. These case studies are taught during the session on “difficult patients,” and the patients are described as refusing alternative therapies, demanding opioids, and

²³² Gatchel, R.J. (2004). “Comorbidity of Chronic Pain and Mental Health Disorders: The Biopsychosocial Perspective.” *American Psychologist* 59(8): 798-805

²³³ Roy, R. (2008). *Psychosocial Interventions for Chronic Pain: In Search of Evidence*. New York: Springer, 19-28

²³⁴ Gatchel, R.J. and Epker, J. (1999). “Psychosocial Predictors of Chronic Pain and Response to Treatment.” In R.J. Gatchel and D.C. Turk (Eds.) *Psychosocial Factors in Pain: Critical Perspectives*. New York: The Guilford Press, 425

presenting with current or historical addictions to opioids. Meanwhile, male patients tend to be included in cases where the presenting complaint is acute pain (for example, rotator cuff injury) or cancer pain. In these cases, the use of opioids is much less contentious, and acute pain and cancer pain are less stigmatized than conditions such as fibromyalgia.²³⁵ Similarly, at School One, the cases involving patients with chronic pain and mental illness almost exclusively feature young women suffering from fibromyalgia, anxiety, and depression. This is also the case at School Three, where patient encounters featuring patients with chronic pain focus on female patients, while case studies on acute pain feature male patients.

Research suggests that more women than men are diagnosed with fibromyalgia and chronic fatigue syndrome, and that women tend to suffer from chronic pain more frequently than men. This difference has been attributed to psychosocial factors such as sex roles, pain coping strategies, and pain-related expectations, as well as biological differences related to sex hormones.²³⁶ Furthermore, men and women also differ in their response to interdisciplinary chronic pain management,²³⁷ and some researchers have suggested that patients may benefit from sex-specific drug therapies.²³⁸ Recent research on animal models, for instance, suggests that immune system-related sex differences may account for differences in pain perception among men and women, as well as the possibility that sex-specific therapies may be required in the treatment of chronic pain.²³⁹ Case studies and patient encounters in the curriculum therefore provide an excellent opportunity to discuss these sex- and gender-based differences, and the implications of these differences for pain management.

²³⁵ Asbring, P. and Narvanen, A-L. (2002). "Women's Experiences of Stigma in Relation to Chronic Fatigue Syndrome and Fibromyalgia." *Qualitative Health Research* 12(2): 148-160

²³⁶ Fillingim, R.B. (2000). "Sex, gender, and pain: Women and men really are different." *Current Review of Pain* 4(1): 24-30

²³⁷ Keogh, E., McCracken, L.M. and Eccleston, C. (2005). "Do men and women differ in their response to interdisciplinary chronic pain management?" *Pain* 114(1-2): 37-46

²³⁸ Wiesenfield-Hallin, Z. (2005). "Sex Differences in Pain Perception." *Gender Medicine* 2(3): 137-145

²³⁹ Sorge, R.E., Mapplebeck, J.C.S., Rosen, S., Beggs, S., Taves, S., Alexander, J.K., Martin, L.J., Austin, J-E., Sotocinal, S.G., Chen, D., Yang, M., Shi, X.Q., Huang, H., Pillon, N.J., Bilan, P.J., Tu, Y., Klip, A., Ji, R-R., Zhang, J., Salter, M.W., Mogil, J.S. (2015). "Different immune cells mediate mechanical pain hypersensitivity in male and female mice." *Nature Neuroscience* 18(8): 1081-3

There has also been a great amount of work done on the impacts of physicians' preconceived notions regarding the legitimacy of chronic pain conditions such as fibromyalgia, and the sexism underlying these negative pain beliefs. Women are often met with skepticism, disbelief, and lack of comprehension by their physicians, such that female patients feel belittled or blamed for their pain.²⁴⁰ These feelings of rejection and guilt can worsen the patient's suffering and pain, creating a vicious cycle of hopelessness, depression, and pain.²⁴¹ Given the significance of physicians' pain assumptions on the way in which they treat pain, it is important that medical curricula avoid implicitly conveying negative pain assumptions to students regarding sex- and gender-related differences in pain perception. Instead, the impacts of psychosocial factors such as sex and gender on chronic pain should be discussed thoughtfully and openly, such that students can reflect on their preconceptions and how these assumptions affect their ability to manage patients' pain.²⁴²

Other factors such as race, ethnicity, culture, age, and religion also affect patients' perception of pain and their response to pain management strategies. For instance, Green et al. (2004) found that African Americans with chronic pain had higher pain severity, depression, and disability compared to whites with chronic pain.²⁴³ There is also considerable evidence of ethnic disparities in the prevalence, progression, and outcomes of pain. These differences have been attributed to inconsistencies in which different groups are prescribed pain medications, differences among ethnic groups in the metabolism, effectiveness, and adverse effects of analgesics, and sociocultural factors that shape the perception of pain.²⁴⁴ The experience of chronic pain also differs with age: while the elderly are generally expected to have higher rates of pain, middle-aged adults tend to be a high-risk group, reporting lower quality of life and a larger number of pain

²⁴⁰ Hoffmann, D.E. and Tarzian, A.J. (2001). "The Girl Who Cried Pain: A Bias Against Women in the Treatment of Pain." *The Journal of Law, Medicine & Ethics* 29: 13-27

²⁴¹ Werner, A. and Malterud, K. (2003). "It is hard work behaving as a credible patient: encounters between women with chronic pain and their doctors." *Social Science & Medicine* 57(8): 1409-19

²⁴² Charlton, J.E. (2005). "Sex and Gender Differences Issues in Pain." *Core Curriculum for Professional Education in Pain*. Seattle: IASP Press, 1-5

²⁴³ Green, C.R., Ndao-Brumblay, S.K., Nagrant, A.M., Baker, T.A., and Rothman, E. (2004). "Race, age, and gender influences among clusters of African American and white patients with chronic pain." *The Journal of Pain* 5(3): 171-182

²⁴⁴ Campbell, C.M. and Edwards, R.R. (2012). "Ethnic differences in pain and pain management." *Pain Management* 2(3): 219-30

locations.²⁴⁵ Unfortunately, there is very little mention of such factors in the three curricula studied here. While most case studies do mention patients' age, other factors such as culture, religion, and family context are typically not included.

Palliative and End-of-Life Care

In all three of the curricula studied here, I found that content on psychosocial determinants of pain is largely absent or lacking. Interestingly, when such content *is* present in the curriculum, it is mostly delivered in sessions on palliative and end-of-life care. For instance, the only session to include the term “biopsychosocial” at School One is a session on cancer pain, in which pain is described as a “complex biopsychosocial event” that causes spiritual, physical, psychological, and social suffering. This session also includes psychosocial considerations physicians should keep in mind when treating cancer pain, such as patients' age, gender, cultural membership, social roles, language, and spiritual beliefs.

In addition, this session also includes a case study that demonstrates a distinctly biopsychosocial approach to pain management. The detailed description of the patient includes his age, gender, medical history, pain locations, and social context. The case study also mentions that the patient's wife suffers from cancer, and that he is her primary caretaker. In discussing priorities for this patient, the patient's goal of remaining at home is taken into account, as is his level of psychosocial distress. In developing a pain management strategy, students are advised to treat the patient's “total pain,” to involve the patient's family, and to consider a variety of pain management strategies beyond pharmaceuticals. The session ends with an in-depth look at the roles of various health professionals in an interprofessional pain management team.

This emphasis on interprofessional pain management is also notable in a session at School Two on pain from a palliative care perspective. In this session, the ethics of pain management are discussed, as well as the role of the physician in a multidisciplinary pain management team. The concept of “total pain” is emphasized, and one of the goals of the session is to reinforce the importance of approaching patients as a “whole” rather than dealing with a single organ system.

²⁴⁵ Rustoen, T., Wahl, A.K., Hanestad, B.R., Lerdal, A., Paul, S. and Miaskowski, C. (2005). “Age and the experience of chronic pain: differences in health and quality of life among younger, middle-aged, and older adults.” *Clinical Journal of Pain* 21(6): 513-23

In this session, patients are described as “wonderfully complex,” and students are taught to address multiple issues occurring simultaneously rather than isolating organ systems and processes. Finally, students are also taught to take patient narratives, which include the patient’s history and social context in addition to clinical signs and symptoms. Similarly, at School Three, the primary session on end-of-life care also focuses on the concept of “total pain.” In this session, students are taught to consider the role of psychological, social, and spiritual concerns in producing pain at the end of life. In terms of pain management, this session also teaches students to approach pain treatment using a variety of non-pharmacological therapies.

Palliative care is defined by the WHO as the “active total care of patients whose disease does not respond to curative treatment.” Palliative care and end-of-life care emphasize the multidimensional aspects of patients and their families, including the physical, psychological, social, and spiritual—in other words, a biopsychosocial approach to health care.²⁴⁶ In order to improve patients’ quality of life, palliative care focuses on the prevention and relief of pain and suffering, by offering a support system to the patient and their families and by utilizing a team approach. Furthermore, as palliative care is most often used in the case of terminal illness or end of life, the goal is not to “cure” the patient but rather to achieve the highest quality of life possible. In this sense, palliative care does not take the curative approach in which biomedicine and the “cuts and chemicals” approach is rooted, but instead aims for realistic and achievable relief of the patient’s “total pain.”

The concept of “total pain” used in palliative care is derived from the work of Cicely Saunders, and refers to suffering that encompasses a person’s physical, psychological, social, spiritual, and practical struggles. The combination of these factors results in a “total pain experience” that is individualized and specific to each person’s particular context and situation.²⁴⁷ Approaching pain management through the concept of “total pain” allows for a biopsychosocial pain management strategy that treats the patient as a whole, taking into account not only clinical symptoms but also the social context in which the patient lives. Furthermore, palliative care emphasizes the concept of “suffering” in pain management. According to Koenig (2003), suffering

²⁴⁶ World Health Organization. (2016). “WHO Definition of Palliative Care.”

<http://www.who.int/cancer/palliative/definition/en/>

²⁴⁷ Mehta, A. and Chan, L.S. (2008). “Understanding the Concept of ‘Total Pain.’” *Journal of Hospice and Palliative Nursing* 10(1): 26-32

consists not only of the disturbing physical sensations of physical pain, but also the “ongoing effect of this conscious awareness of physical pain [on] the psychological self.”²⁴⁸ Suffering, an emotional reaction to the threat of physical damage to the body, is further extenuated by loss of self-esteem and changes in one’s social role resulting from chronic pain. The extent to which one suffers from chronic pain, then, depends in large part on whether pain results in social dislocation.²⁴⁹

Understanding how pain causes suffering allows health professionals to approach pain management with the goal of not only alleviating pain, but also improving overall quality of life. In many cases, chronic pain cannot be entirely relieved, and so physicians and patients should focus on achieving realistic goals with an eye to function and overall quality of life.²⁵⁰ By taking a palliative care approach in which pain is understood as suffering, physicians can assist patients in achieving these goals as part of an interdisciplinary pain management team. By treating the patient’s “total pain,” physicians can also address aspects of suffering such as loss of control, anxiety, and guilt, such that the patient’s overall quality of life is improved, even in cases where complete pain relief is not achievable.²⁵¹

While in each of the curricula studied here palliative pain management is discussed in terms of cancer pain and end-of-life care, I would argue that a palliative approach offers an opportunity to incorporate a biopsychosocial understanding of pain into the curriculum. While the relief of suffering and the consideration of spiritual and psychological concerns is of great importance in treating cancer pain and pain at the end of life, this approach is equally imperative in managing chronic pain, which can cause a significant amount of distress and suffering. I was not surprised to find that sessions on cancer pain and palliative care were the most successful at incorporating concepts such as “total pain” and psychosocial care. A focus on the patient as a whole and an equal consideration of biological, psychological, and social aspects of health and illness is at the foundation of palliative care, and the effective relief of pain and suffering is one of its primary

²⁴⁸ Koenig, H.G. (2003). *Chronic Pain: Biomedical and Spiritual Approaches*. New York: Haworth Pastoral Press, 147

²⁴⁹ Roy, R. (2008). *Psychosocial Interventions for Chronic Pain: In Search of Evidence*. New York: Springer, 19-28

²⁵⁰ Filorama, M.A. (2007). “Improving goal setting and goal attainment in patients with chronic noncancer pain.” *Pain Management Nursing* 8(2): 96-101

²⁵¹ Chapman, C.R. and Gavrin, J. (1999). “Suffering: the contributions of persistent pain.” *The Lancet* 353: 2233-2237

goals. This may be due to the emphasis in palliative care on achieving realistic goals and the highest quality of life possible, in contrast to the “curative” approach typical of biomedicine. Teaching chronic pain management from a palliative perspective opens the possibility of moving beyond biomedicine and conceiving of chronic pain as a biopsychosocial experience that, while usually incurable, can be treated in order to alleviate suffering and improve quality of life.

Summary

In this chapter, I began by identifying biopsychosocial curricular content in which biological, psychological, and social determinants of health are understood as equally co-producing the experience of pain. I found that this content was largely limited to brief, vague descriptions of mental illness, and that mental illness was mostly restricted to the discussion of anxiety and depression. In contrast, social determinants of health such as social dislocation and social location were minimally discussed, if at all. While case studies and patient encounters provide an opportunity for undergraduate medical students to consider the impact of social determinants of health on the experience of pain, instead the inclusion of such factors perhaps marked implicit negative pain assumptions demonstrating sexism and preconceived notions of the legitimacy of chronic pain.

Having noted these limitations in the curricula, I also identified sessions on palliative and end-of-life care as demonstrating a biopsychosocial approach in which pain is understood as a “total pain” experience. In these sessions, pain is conceptualized not only as a symptom or as physical discomfort, but instead as psychological, social, physical, and spiritual suffering. I argued that a palliative perspective of pain should be used not only in discussing pain management at the end of life, but also as an effective approach to chronic pain management given the emphasis on biopsychosocial determinants of health as opposed to a curative approach to pain.

In the next chapter, I conclude by describing the limitations of this study, and I revisit my research questions in order to reflect on the state of pain content in undergraduate medical curricula in Ontario. Drawing on this analysis, I also offer suggestions for the development of a biopsychosocial pain curriculum, and how this curriculum might be organized and delivered.

Chapter Eight: Developing a Pain Curriculum: Final Thoughts and Future Challenges

“The work which you are accomplishing is immensely important for the good of humanity, as you seek the ever more effective control of physical pain and of the oppression of mind and spirit that physical pain so often brings with it.”

Pope John Paul II, letter to John Bonica at Fifth World Congress of Pain, 1987

In this thesis I have attempted to assess the amount and nature of pain content in undergraduate medical curricula in Ontario. In doing so I contacted three medical schools and requested curricular documents, objectives relating to pain and pain management, as well as other information regarding regulatory standards and the development of the curriculum. My interest is not only in the overall quantity of pain content in the curriculum, but also how this content is developed, organized, and delivered, and the standards regulating what medical students learn about pain throughout an undergraduate medical program in Ontario. From a sociological perspective, I was particularly interested in the underlying pain beliefs and medical models framing this content. Given the importance of physicians’ pain beliefs in treating chronic pain, particularly in light of the widespread stigmatization of chronic pain in Canada and elsewhere, I sought to identify implicit attitudes towards pain and pain management embedded in the curricula.

In this final chapter, I draw on my findings to discuss how we might proceed in developing a pain curriculum. Two of the three medical schools studied here reported that they do not have a pain curriculum, although they are in the process of developing one. While School One does have a curriculum structuring its pain week, the program is in the process of overhauling the pre-clerkship curriculum and, by extension, the pain curriculum. It is therefore important to reflect on the current state of pain content in Ontario, and how we might move forward to develop a pain curriculum that integrates the findings and conclusions of the chronic pain literature. Having offered suggestions to this end, I move on to consider some of the limitations of this study. I finish by returning to my research questions in order to summarize my assessment of pain content in the undergraduate medical curricula studied here.

Developing an Undergraduate Pain Curriculum

Before assessing the actual pain content in each of the medical curricula studied here, I began by taking stock of the standards regulating pain content in undergraduate medical programs in Canada. I was interested in understanding what medical students are expected to learn about pain and pain management while completing an MD program, and how the attainment of these standards is evaluated. In attempting to research any such international, national, and provincial standards, I was surprised to find that there *are* no standards determining what students learn about pain. Despite the fact that pain is now understood as a disease in its own right, pain is included in the MCC Objectives for the Qualifying Exam solely as a symptom of other diseases. While other health professions such as dentistry and veterinary sciences include pain as a disease in its own right in their entry-to-practice competency requirements, medical students are required to assess pain only as a symptom of other diseases.²⁵²

In order to develop rigorous and up-to-date pain curricula in Canada, research suggests that it is imperative to foster a regulatory environment in which medical students are expected to be capable of recognizing and treating pain as a disease in its own right.²⁵³ The lack of pain competencies begets additional problems, such as the fact that pain content has no “home” in the curriculum and is often fragmented throughout numerous general courses.²⁵⁴ As such, the inclusion of pain as a disease in its own right, as well as the development of an accredited pain medicine program at the Royal College of Physicians and Surgeons, would allow for a regulatory framework which would require the inclusion of pain management in the curriculum. This change, in turn, would require the development of a pain curriculum, as opposed to fragmenting pain content throughout general courses without providing a single “home” in the form of at least one required pain-specific course.

After assessing the standards regulating pain content in undergraduate medical curricula internationally and nationally, I narrowed my focus to the institutional organization of pain content. In doing so, I continued the work of Mezei and Murinson (2011) by using AAMC

²⁵² Watt-Watson, J. et al. (2008). “Entry to practice pain competencies: Survey of requirements for health science students.” *Pain Research and Management* 13, 111-53

²⁵³ Watt-Watson, J. et al. (2008), 153

²⁵⁴ Thomson, P. (2006). “Lessons of Pain: A Symptom Stretched Across All Specialties.” *The New Physician* 55(8)

Curriculum Inventory Content Reports to identify major trends in pain content in Canada.²⁵⁵ When Mezei and Murinson conducted their study in 2010, they found that most programs taught pain content within a general required course, and that these sessions on pain were roughly an hour in length. Furthermore, while 92.3% of Canadian medical schools included pain sessions in at least one course (compared to 79.8% of US schools), the total number of pain teaching hours per school ranged from 3 to 76 hours, with a mean of 27.56 hours. In the most recent AAMC report from 2014-2015, only five Canadian schools participated, and only four reported pain content. Of this content, most was taught in lectures, with few additional resources being used to teach students about pain management.

In their analysis of the AAMC report, Mezei and Murinson criticize the fragmented nature of pain content in the curriculum, noting that such fragmentation limits students' ability to gain an emotional, psychological, and cognitive understanding of pain. The ability to achieve a comprehensive, holistic understanding of pain is further restricted by the limited use of instructional resources and delivery methods. These findings further support my earlier remarks regarding the importance of developing a pain curriculum, such that pain content is not simply spread throughout the curriculum wherever there is space but instead organized such that students learn to treat pain as a disease in its own right.

Overall, undergraduate medical students receive very few hours of pain education. Watt-Watson et al. (2009) found that that 67.5% of surveyed health sciences programs were unable to account for specific hours designated to pain content in their curricula, and that, on average, Canadian veterinarians receive up to five times more pain management training than other health sciences programs.²⁵⁶ According to the AAMC reports from 2010 and 2014-2015, we also know that the pain content students *do* receive is usually introduced early in the curriculum, typically in the pre-clerkship. In the case of the three medical programs studied here, School One and School Three teach the bulk of their pain sessions in students' second year. However, in the case of School Two, the primary sessions on pain are taught during the clerkship, particularly in preparation for

²⁵⁵ Mezei, L. and Murinson, B.B. (2011). "Pain Education in North American Medical Schools." *The Journal of Pain* 12(12): 1199-1208

²⁵⁶ Watt-Watson, J., et al. (2009). "A survey of prelicensure pain curricula in health science faculties in Canadian universities." *Pain Research and Management* 14(6), 441-2

residency. Given that the IASP recommends introducing pain content early in the curriculum,²⁵⁷ I would suggest medical programs should continue to teach these sessions in the pre-clerkship, and that medical programs such as School Two should work to introduce these primary pain sessions earlier in the program.

In terms of recommendations made by the IASP, as well as chronic pain experts and curriculum studies scholars, the three medical schools studied here follow these guidelines to varying extents. School One, for instance, adheres to the IASP principle of “interprofessional education” by organizing its pain week as an interprofessional learning experience. Furthermore, the organization of pain content into a “pain week” reduces curricular fragmentation. That this pain week is delivered during students’ second year also allows for the early introduction of interprofessional pain education.

At School Two, most of the sessions on pain are organized as case-based, small group workshops. The primary lecture on chronic pain is provided by an expert guest lecturer, while other sessions are organized by various departments, showing some use of diverse resources. That the bulk of the pain education students receive is delivered through these sessions also reduces fragmentation to some extent. However, the bulk of School Two’s pain content is taught in students’ fourth year, as a means of preparing them for residency. This late introduction of pain content is not ideal and does not allow for students to reflect and build upon these concepts over time.

The pain content at School Three is the most fragmented among all three programs, with content spread through numerous sessions and patient encounters. The primary pain session is offered in students’ second year, while most of the remaining pain content is taught during the first three years of the program. Much of this content is delivered through case-based modules and small group sessions. While a case-based curriculum is largely considered the most effective instructional method, by teaching pain content in separate modules students’ pain education is further fragmented. Furthermore, in contrast to the other two programs, School Three does not offer a specific session on chronic pain; chronic pain is touched upon in the primary lecture on

²⁵⁷ International Association for the Study of Pain. (2012). “IASP Interprofessional Pain Curriculum Outline.” *International Association for the Study of Pain*, <http://www.iasp-pain.org/Education/CurriculumDetail.aspx?ItemNumber=2057>

physiology and pharmacology of pain, but otherwise this session mostly focuses on acute pain management.

The AAMC Curriculum Inventory Report allows us to assess major trends in Canadian medical programs, and to compare current practices to recommendations made in the literature. The data amalgamated in these reports is drawn from CurrMIT, a centralized repository of curricular information in which North American medical schools are encouraged to participate. Beyond its utility in gathering and storing such data, CurrMIT can also be used by programs to share curricular content. The database contains descriptions of more than 15 000 courses and clerkships, approximately 115 000 sessions, and more than 400 000 keywords and word strings documenting specific details of instruction.²⁵⁸ This data can be accessed by any participating medical program. CurrMIT provides a unique opportunity for medical curricula to collaborate in developing pain content. While many of the faculty and educational developers I spoke with mentioned the challenge of creating a pain curriculum, sharing objectives and materials among programs could greatly ease this burden. That only four Canadian medical schools provided pain content data in 2014-2015 represents a missed opportunity.

Having examined the regulatory and institutional contexts in which pain content is developed, organized, and delivered, I next moved on to consider the content itself. This involved closely reading all of the curricular documents I gathered, and comparing content to existing standards and the literature on pain and suffering. In doing so I did not simply identify what students learn about pain and when this content is delivered. Instead, I conducted a content analysis that would allow me to tease out the implicit medical models, pain theories and assumptions imbued within the curriculum and shaping students' perceptions of pain. As a heavily stigmatized, racialized and gendered disease, chronic pain has been attributed to malingering, hypochondria, hysteria, and otherwise said to exist "only in people's minds." Furthermore, as a complex biopsychosocial event, chronic pain defies biomedical expectations of health and illness, and requires that physicians manage the patient "as a whole" in order to achieve significant pain relief.²⁵⁹ Pain beliefs therefore play an essential role in medical students' pain education.

²⁵⁸ Salas, A.A., Anderson, M.B., LaCourse, L., Allen, R., Candler, C.S., Cameron, T. and Lafferty, D. (2003). "CurrMIT: a tool for managing medical school curricula." *Academic Medicine* 78(3): 275-9

²⁵⁹ Jackson, J.E. (2005). "Stigma, liminality, and chronic pain: Mind-body borderlands." *American Ethnologist* 32(3): 332-353

From curriculum studies, we know that education is not merely the act of training students—in the case of medicine, for instance, to carry out certain learned clinical skills. While medical curricula might endeavour to be value-neutral, and to produce physicians who are equally objective, in fact no curriculum is value-free. As Kelly (2009) argues, the very decision to refuse to distinguish training from education, or to insist that one's curriculum is value-neutral, is in fact an ideological position.²⁶⁰ While curriculum planners might argue that their curriculum is value-free, in actuality no such neutral curriculum exists, and it is impossible to plan a curriculum free of any type of ideology or values. From this perspective, rather than insisting that one's curriculum is objective, it is preferable to state outright the values imbued in the curriculum, and to make explicit the ideological stance advocated by the curriculum.²⁶¹

In the case of medical education, I have described at length in the preceding chapters the dualist, biomedical model in which contemporary medicine operates, and how this model frames and is re-affirmed by medical curricula. It is impossible to develop a medical curriculum that is entirely neutral or value-free, despite medicine's claims to objectivity. In my analysis of curricular content, I paid particular attention to the values and medical models inherent in the curricula, and how these convey certain beliefs regarding the body and pain. For instance, the unquestioned dominance of the biomedical perspective in each of the three curricula studied here means that theories challenging the tenets of this model—for instance, Melzack and Wall's gate control theory—are made mainly to fit within biomedicine. In this case, while the gate control theory is presented as the primary pain theory in all three curricula, some aspects of the theory are emphasized (e.g. neurophysiological mechanisms) while others are largely excluded (e.g. role of psychosocial factors in this process).

In addition, while theories of pain have changed to include psychosocial aspects of pain, pain management content at all three curricula focuses almost exclusively on pharmaceuticals. Although research has demonstrated the effectiveness of a biopsychosocial approach to pain, as well as complementary and alternative pain treatments, these are only rarely included in the three curricula studied here. When certain complementary treatments such as physiotherapy and massage therapy are mentioned, the mechanisms underlying their effectiveness are not described, and they are made to fit within a biomedical model.

²⁶⁰ Kelly, A.V. (2009). *The Curriculum: Theory and Practice (6th Edition)*. London: Sage, 78

²⁶¹ *ibid.*, 90

I suggested in the previous chapter that a biopsychosocial pain curriculum could be developed using the lens of palliative care, which historically has conceptualized pain as “total pain” and understood pain as an experience of suffering. In doing so, palliative care has tended to be explicit about its ethical commitments to relieving suffering and treating the person as a whole. By acknowledging the biomedical values implicit in the curriculum, we can challenge these taken-for-granted aspects of the curriculum and develop an educational experience that incorporates contemporary advances in pain research. Although these theories and modalities challenge biomedicine and mind-body dualism, they are integral to the successful treatment of chronic pain. All three of the curricula implicitly acknowledge the limits of biomedicine by repeating that opioids “don’t work” and that pharmaceuticals have “limited effectiveness” in treating chronic pain. And yet, in admitting the limits of this model, each curriculum proceeds to teach pain from a biomedical perspective, failing to take a biopsychosocial approach. When it is conceded that “affective aspects of pain,” as they are called at School One, affect the onset and experience of pain, this is largely couched in neurophysiological language and limited to a discussion of anxiety and depression as co-morbidities.

Similarly, while opioids play a significant role in chronic pain treatment, their use is heavily contested and stigmatized.²⁶² Special care must be taken to consider the ways in which opioid use for chronic pain is framed in the curriculum. Constantly linking chronic pain to opioid addiction, and describing pain patients as “difficult” and “overwhelming,” can reinforce negative pain beliefs and opiophobia among medical students.²⁶³ Similarly, the curricula tend to discuss case-based problems in such a way that students are forewarned that chronic pain patients are “difficult” and that working with these patients will be unrewarding. While chronic pain is challenging to treat, it is important to keep in mind that this is because the *condition* itself is complex, not because the patients themselves are difficult or unwilling to be helped. While opioid use, dependence, tolerance, and addiction are important issues worth discussing in chronic pain

²⁶² Rosenblatt, R.A. and Catlin, M. (2012). “Opioids for Chronic Pain: First Do No Harm.” *Annals of Family Medicine* 10(4), 300-1

²⁶³ Morley-Forster, P.K., Pergolizzi, J.V., Taylor Jr., R., Axford-Gatley, R.A., and Sellers, E.M. (2013). “Mitigating the risk of opioid abuse through a balanced undergraduate pain medicine curriculum.” *Journal of Pain Research* 6, 791-801

care, research indicates that these discussions should frame addiction as a disease to be diagnosed and treated, rather than a characteristic of “difficult” patients or a moral failing.²⁶⁴

Research also suggests that a balanced pain curriculum can reduce the risk of opioid abuse in pain patients by providing guidance to physicians on minimizing the risks of abuse and diversion.²⁶⁵ Teaching medical students to assess patient risk, to select the appropriate formulation, dose, and duration of therapy, and to detect and respond to aberrant behaviour will prepare students to prescribe opioids for pain patients.²⁶⁶ In addition to clinical skills, it is equally important to promote a balanced perspective of opioid use for pain among students. Moulin et al. (2002), for instance, identify opiophobia among medical doctors as a leading cause for the undertreatment of pain in Canada. The authors suggest that physician and patient education on opioid use for pain is essential in order to “dispel myths that addiction is common and that opioid analgesics should be reserved for terminal illnesses.”²⁶⁷

In sum, in developing a pain curriculum, it is important for curriculum planners to consider not only the amount of pain content and how this content is delivered, but also the values and beliefs implicit in the curriculum. According to Mezei and Murinson (2011), for instance, it is essential that pain education foster an environment in which students learn about pain cognitively, emotionally, socially, spiritually, and psychologically, and in which stigmas surrounding chronic pain are discussed openly and critically.²⁶⁸ It is equally important for curriculum planners to carefully consider the medical models in which this content is framed, recognizing that chronic pain is a complex condition that challenges many biomedical assumptions about the body and pain. Failing to grapple with these contradictions, and the decision to simply force gate control theory and other psychosocial factors into a biomedical framework, does not ensure objectivity. Instead,

²⁶⁴ Miotto, K. and Ling, W. (1996). “Diagnosing Addictive Disease in Chronic Pain Patients.” *Psychosomatics* 37(3): 223-235

²⁶⁵ Morley-Forster, P.K., Pergolizzi, J.V., Taylor Jr., R., Axford-Gatley, R.A., and Sellers, E.M. (2013). “Mitigating the risk of opioid abuse through a balanced undergraduate pain medicine curriculum.” *Journal of Pain Research* 6, 791-801

²⁶⁶ *ibid.*, 797

²⁶⁷ Moulin, D.E., Clark, A.J., Speechley, M., and Morley-Forster, P.K. (2002). “Chronic pain in Canada—Prevalence, treatment, impact and the role of opioid analgesia.” In *Pain Research and Management* 7(4), 184

²⁶⁸ Mezei, L. and Murinson, B.B. (2011). “Pain Education in North American Medical Schools.” *The Journal of Pain* 12(12): 1199-1208

curriculum planners need to be aware that in doing so, they are making certain ethical commitments about what, and how, students learn about chronic pain.

Limitations

The present study has a number of limitations. Most obviously, the study was limited to three undergraduate medical curricula in Ontario. This thesis does not consider the fourteen other medical schools in Canada, in which no doubt a variety of teaching methods in pain education are being used. However, in reviewing the AAMC Curriculum Inventory Reports, it is worth noting that most of the national data reflect trends I have noted in the three programs studied here. Given this, it is reasonable to expect that the pain content studied here does not differ hugely from content taught at other schools in Canada. Furthermore, in considering the three medical programs to be included in this study, I was careful to select schools that differ in a number of ways (student size, age of the school, geographical area, curricular organization) so as to provide some variety and breadth.

A more serious limitation is the fact that I have restricted this study to analyzing undergraduate medical curricula, without considering residency and other post-graduate training. It was beyond the scope of this thesis to consider these learning experiences, particularly given that medical students choose from a wide range of residency options and specializations. Furthermore, given that the residency curriculum is organized quite differently from undergraduate medical curricula, it simply was not feasible to include medical residencies in the present study. On this note, in briefly researching medical residencies in Canada I found that several medical programs have started to offer residencies in pain medicine. Pain content in medical residencies might therefore present an important avenue of research for future study.

Given that I limited this study to analyzing curricular documents, I did not interview curriculum planners, faculty, or students in this study. This limited my ability to fully answer some of my research questions, particularly regarding curriculum planners' intentions in developing the curriculum and students' educational experiences. Interviewing educational developers would have allowed substantial insight into how pain content is developed, and how decisions regarding delivery and organization are made. With that being said, I did attempt to access the curriculum committee notes at all three programs, and was ultimately unsuccessful in doing so. Reviewing

these notes might have allowed some insight, if limited, into this decision-making process. However, a content analysis of curricular documents does not tell the full story of what occurs in classroom discussions and other learning events.

Finally, it is important to note that curriculum content changes constantly and rapidly. One of the programs studied here is in the process of overhauling its pre-clerkship curriculum, and the two other programs expressed interest in developing a pain curriculum. As these changes are implemented, it will be interesting to see whether the trends and approaches identified here will persist. At each of the schools I studied, faculty and curriculum planners noted gaps in the pain content and changes they would like to make. Medical curricula must keep abreast of changes in medical knowledge and practice, and it remains to be seen whether the popularity of the biopsychosocial approach in the chronic pain literature will be translated to the curriculum.

Conclusion

I began this thesis broadly interested in the experiences of people living with chronic pain, and the work they do in accessing health care for their pain. In interviewing chronic pain sufferers, I noticed that they organized their narratives around their experiences with doctors: going to a doctor for the initial sensation of physical discomfort, seeing various specialists in an attempt to find a diagnosis and cure, and working with doctors in attempting to manage their pain. Throughout each interview, participants repeatedly asked me why doctors treat pain in a way that they felt was ineffective. “Why didn’t my doctor know what was wrong with me?” “Why did she treat me with pills that made my pain worse, not better?” “Why didn’t he send me to a specialist?” “Why didn’t she believe my pain was real?” Participants also speculated as to why doctors struggle to treat chronic pain, and why pain often goes undertreated or untreated. They suggested, for instance, that perhaps doctors are opiophobic, or they believe that pain is all in patients’ heads.

That patients speculate as to their doctors’ motives and beliefs is unsurprising. However, in analyzing these transcripts I was influenced by George Smith, who writes that speculative explanations “preclude understanding how the world actually works.”²⁶⁹ Instead, drawing on the work of Dorothy Smith, he argues that sociologists should take an institutional ethnographic

²⁶⁹ Smith, G. (1990). “Political Activist as Ethnographer.” *Social Problems* 37(4), 634

approach that allows us to understand the interior workings of what he calls “politico-administrative regimes,” on which basis we can then effect real change in this regime.²⁷⁰ For institutional ethnography, there is an explicit commitment to producing sociology *for* people; in this case, producing knowledge that can effect real change and benefit people suffering from chronic pain. From this perspective, it is not enough simply to record participants’ experiences of living with intractable pain and how difficult this experience has been. Instead, I wanted to go beyond people’s local actualities to understand *why* doctors treat chronic pain in a way that the community widely feels is ineffective.

By tracing the extra-local relations organizing chronic pain sufferers’ experiences of seeking health care for their pain, I began to map the career of a medical doctor in Canada. In doing so, I started to realize that medical doctors are not simply born with knowledge of the body and pain. They gain this knowledge from medical schools, institutions in which the educational experience is organized by a curriculum. This curriculum represents the totality of the student’s educational experience, while also textually mediating the student’s educational experience by encompassing four dimensions: the intentions of planners, the procedures adopted to implement these intentions, the actual experiences of students as teachers attempt to carry out these intentions, and the “hidden” learning that occurs as a by-product of the organization of the curriculum.²⁷¹

In this thesis, I focused on the first two dimensions of the curriculum. To do so, I sought to assess the regulatory and institutional contexts in which pain content is developed, and how this content is organized into the curriculum and delivered. While some work has been done to quantify the number of hours of pain content medical students receive,²⁷² I was interested in the medical models, theories of pain, and pain beliefs framing this pain education. Given the emphasis in curriculum studies on uncovering the values advocated by an educational program, I studied each curriculum with an eye towards understanding how medical students are taught to conceive of and manage pain. In particular, I was interested in assessing whether medical curricula teach pain in a

²⁷⁰ *ibid.*

²⁷¹ *ibid.*

²⁷² Watt-Watson, J., McGillion, M., Hunter, J., Choiniere, M., Clark, A.J., Dewar, A., Johnston, C., Lynch, M., Morley-Forster, P., Moulin, D., Thie, N., von Baeyer, C.L., and Webber, K (2009). “A survey of prelicensure pain curricula in health science faculties in Canadian universities.” *Pain Research and Management* 14(6), 441-2

way that aligns with the biopsychosocial approach advocated by the chronic pain literature, or if chronic pain content is framed largely through the orthodox lens of biomedicine. To do so, I posed the following research questions:

- What international, national, and provincial standards regulate pain content in undergraduate medical curricula in Ontario?
- How is pain content organized in the medical curriculum?
- What do students learn about pain in undergraduate medical programs in Ontario?
- What underlying theories of pain, pain beliefs, and assumptions regarding the role of medicine and the body, are integrated into medical curricula?

In order to answer these questions, I contacted three undergraduate medical programs in Ontario and requested curricular content related to pain. At all three schools I was put in contact with faculty members, educational developers, and other curriculum planners, who provided me with documents such as spreadsheets of total pain objectives, lecture slides, course descriptions, reading lists, and course syllabi. Having gathered this information, I analyzed these curricular documents not only to assess the total amount of pain content, but also major trends, topics, and underlying pain beliefs and attitudes towards pain in each curriculum. In order to summarize the results of these findings, I conclude by answering each of my research questions.

- What international, national, and provincial standards regulate pain content in undergraduate medical curricula in Ontario?

There are few standards regulating pain content in undergraduate medical curricula. While the IASP and the Mayday Foundation have published recommended pain competencies and interprofessional curricula as guidelines, these are not binding in any way. Furthermore, “pain” as a disease in its own right is not included in Canadian entry-to-practice competency requirements, nor is pain medicine an accredited program with the Royal College of Physicians and Surgeons of Canada. In terms of the MCC Objectives for the Qualifying Exam, “pain” is included as a presenting symptom for a variety of diseases, but pain management itself is not an examination objective for physicians. The lack of entry-to-practice pain competencies in Canada may account

for the fact that two of the programs studied here do not have a pain curriculum, as well as for the significant disparity in the number of pain sessions and total pain hours in medical programs across Canada.

- How is pain content organized in the medical curriculum?

According to the AAMC Curriculum Inventory Reports from 2010 and 2014-2015, most pain content in Canada is taught during the first two years of the undergraduate medical program (usually pre-clerkship). Pain content is most often taught within several general required courses, and is therefore fragmented throughout the curriculum. The majority of these sessions are organized as lectures, although some pain content is taught in small group sessions and case-based problem workshops. The total number of pain teaching hours varies significantly between programs, ranging from 3 to 76 hours with a mean of 27.56 hours. On average, most pain sessions are roughly an hour in length. Other studies have found that the majority of health sciences programs in Canada are unable to specify designated hours for pain content in pre-licensure curricula, and that medical students receive between 0 to 38 hours of pain education, with a mean of 16 hours.

The curricula studied here largely reflect these trends. At Schools Two and Three pain content is fragmented throughout the curriculum, while at School One most pain content is delivered during an interprofessional pain week. Furthermore, at all three programs the primary pain sessions are organized as lectures, although some pain content is delivered through small group sessions, particularly at School Three. We know, then, that medical students receive comparatively few hours of pain education, and that this content is largely fragmented throughout the curriculum. While most programs introduce pain content early in the curriculum, others—such as School Two—include primary pain sessions in students' third or fourth year. Furthermore, most pain content is delivered through lectures, and the curricula studied reflect AAMC findings that programs do not utilize the numerous resources at their disposal in teaching pain content to medical students. Given that the research indicates that pain education should foster a cognitive, emotional, psychological, and spiritual understanding of pain and pain management, that pain content is mostly delivered through lectures is concerning. Though some sessions, particularly at School Three, are taught in case-based, small group sessions, these sessions would also benefit from

utilizing resources such as expert guest lecturers, patient encounters, concept mapping, simulation, and educational technology.

- What do students learn about pain in undergraduate medical programs in Ontario?

In analyzing the three medical curricula studied here, I was particularly interested in knowing what, exactly, medical students learn about pain and pain management. Overall, I found that the medical curricula focus the bulk of pain content on three topics: pain mechanisms and manifestation, non-opioid pharmaceuticals, and opioid analgesics and addiction. In all three programs, the bulk of the primary pain sessions focus on pain mechanisms and manifestation, emphasizing the physiology of pain and inflammation and providing a foundation for students to identify points of intervention for analgesics. I was surprised to find that these sessions teach Melzack and Wall's gate control theory as the primary pain theory. However, I also found that certain aspects of the theory that align with biomedical conceptualizations of pain--such as mechanisms of action in the dorsal horn--are emphasized, while psychosocial aspects are only briefly listed or excluded entirely.

Melzack and Wall developed the gate control theory, in large part, in an attempt to make sense of instances in which chronic pain develops with no evidence of injury, or in cases where there is tissue damage but no sensation of pain. In conceiving of a "gate" mechanism that opens and closes in response to painful and non-painful stimuli, Melzack and Wall provided a physiological explanation for the observed effects of psychosocial factors on pain. Psychosocial influences on the onset, duration, perception and experience of pain are at the crux of the gate control theory. However, none of the programs studied here highlight these aspects of the theory or its history. If psychosocial dimensions of pain are mentioned, they are briefly listed as "affective aspects" of pain at the end of a lecture, rather than being centred as they were in Melzack and Wall's work.

In terms of pain management, the majority of content focuses on both opioid and non-opioid pharmaceuticals. In each of the curricula, the primary session on pain management contains the word "pharmacology" or makes reference to pharmaceuticals in the session title—"Pharmacology of Pain," "Physiology and Pharmacology of Pain," "Persistent Pain and Prescribing," and so on. These session titles reflect the overwhelming focus on pharmaceuticals in lecture content. In all three programs, while the limitations of using pharmaceuticals (and in

particular, opioids) to treat chronic pain are acknowledged, the bulk of the sessions on pain management focus on pharmaceuticals with little mention of other treatment modalities. When therapies such as physiotherapy, massage therapy, acupuncture, and cognitive-behaviour therapy are included, these are briefly listed without further elaboration as to how these therapies relieve pain and when to refer patients for these treatments.

I also found that a great deal of pain content focuses on opioid medications and issues of substance abuse and addiction. While I did not request content or curricular objectives related to addiction from the three programs I contacted, two schools included information on this content in the documents they provided me. It seemed clear that the terms “opioid” and “addiction” had been included in searches of total pain objectives, and that content on pain and addiction are closely linked in these curricula. In all of the primary sessions on pain, a considerable portion of the session is dedicated to screening for addiction and identifying aberrant, drug-seeking behaviours among chronic pain patients. In terms of other general required courses in the curriculum, pain is often mentioned in relation to addiction, and School Three in particular had a session specifically devoted to pain and addiction. While the IASP includes only one objective related to opioids and three objectives on addiction, in all three curricula a significant portion of pain content focused on opioids for pain management and related issues of addiction.

- What underlying theories of pain, pain beliefs, and assumptions regarding the role of medicine and the body are integrated into the medical curriculum?

Having identified what students learn about pain and pain management throughout an MD program, it is equally important to assess the underlying values and pain assumptions framing this content. Drawing on curriculum studies, I argued that education does not mean simply training students to perform clinical tasks, but also providing an opportunity to foster cognitive, psychological, social, and spiritual development. While curriculum planners may insist that they intend to create educational experiences that are value-neutral and objective, in reality the very choice of attempting to produce a value-free curriculum is itself an ideological stance. Many of the objective “facts” presented in sessions on pain and pain management, for instance, are heavily contested and debated—even within and among the curricula. A session on dried cannabis for chronic pain at School One, for instance, warns students that cannabinoids for pain produced by

pharmaceutical companies are “even stronger” than cannabinoids purchased “on the street.” However, in sessions on cannabinoids for pain at Schools Two and Three, students are advised to ensure that their patients purchase cannabinoids from “legitimate” sources, given that “street stuff” is significantly stronger and more difficult to dose than cannabinoids produced by pharmaceutical companies. Likewise, in a lecture at School One on chronic pain and mental health, students are taught that opioid analgesics are ineffective in treating chronic pain and should only be used in cases of severe neuropathic pain. However, in the lecture on pharmacology for pain at this same program, the bulk of the lecture is focused on teaching students which opioids to prescribe for various chronic pain conditions.

As I described in my review of the literature, the use of opioid analgesics for chronic pain management has been both supported and criticized. Recently, studies have suggested that contrary to popular belief, most patients with chronic pain do not experience opioid addiction, tolerance or dependence, and instead enjoy pain relief with minimal adverse effects. Others have found that most chronic pain patients who have been prescribed opioids should not use opioids for their pain, and that prolonged use of opioids by chronic pain patients frequently results in tolerance or addiction. These ongoing debates indicate the large number of attitudes and findings in regards to the use of opioid analgesics for chronic pain, although these contentions are rarely mentioned in the three curricula studied here.

As chronic pain is a complex and heavily stigmatized disease, it is important to examine the assumptions and values we hold regarding chronic pain and the use of opioids for pain, and how these attitudes are translated into the curriculum. While research has shown that negative pain beliefs among physicians result in opiophobia, under-prescribing of necessary analgesics, and feelings of rejection and guilt among patients, studies have also found that carefully-designed pain curricula can foster positive pain beliefs among medical students and physicians. It is therefore particularly important to evaluate the implicit pain beliefs and medical models framing chronic pain content. By acknowledging the ideologies and values framing pain content in their curricula, undergraduate medical programs can work towards being more deliberate in the pain beliefs they seek to foster in students.

Overall, I found that the three medical curricula studied here take a biomedical approach to pain management without stating this position outright, and therefore, without discussing alternative models in a meaningful way. These curricula take for granted that chronic pain is to be

managed through a biomedical approach, and without naming this model or explicitly stating this stance, do not have to defend the use of this model and the rejection of other options. In this way, while some aspects of a biopsychosocial approach to pain are occasionally mentioned—such as a brief discussion of “affective aspects” of pain—overall these concepts are made to fit within an orthodox biomedical approach. Furthermore, pain management content in the curriculum is almost overwhelmingly focused on pharmaceuticals, despite the existence of a great number of complementary and alternative therapies for pain management. And while a great deal of research has uncovered the importance of psychosocial factors such as social dislocations and identity in the experience of pain,²⁷³²⁷⁴ these are not mentioned in any patient encounters or case-based group sessions.

Interestingly, the only sessions to take a decidedly biopsychosocial approach to pain management are sessions on palliative and end-of-life care. At all three programs, these were the only sessions to use the term “biopsychosocial” and to describe pain as a biological, psychological, and social event. These sessions describe in great detail the impact of social dislocation and various aspects of patients’ identities and lives on the experience of pain. I suggest that this is because sessions on palliative care are explicit in the ways in which they conceptualize pain and the models through which pain is understood. In all three sessions the concept of “total pain” is employed, and pain is described as not only physical discomfort but also suffering. These sessions on palliative care make explicit their commitment to relieving not only physical pain, but also emotional, spiritual, familial, and psychological suffering. In doing so, a palliative care perspective allows us to move beyond a biomedical, curative approach in which pain is understood solely as a result of nociception, such that we can consider the patient as a whole and work to relieve their “total pain.”

By explicitly stating the ways in which we conceptualize and think of pain, we open the possibility of challenging traditional approaches to pain management. It is not enough to take for granted a biomedical approach to pain under the assumption that this framework is the only option, particularly given the amount of research demonstrating the ineffectiveness of biomedical pain

²⁷³ Roy, R. (2008). *Psychosocial Interventions for Chronic Pain: In Search of Evidence*. New York: Springer, 19-28

²⁷⁴ Gatchel, R.J. and Epker, J. (1999). “Psychosocial Predictors of Chronic Pain and Response to Treatment.” In R.J. Gatchel and D.C. Turk (Eds.) *Psychosocial Factors in Pain: Critical*

management for chronic pain. Furthermore, by engaging in frank and open discussion of our pain beliefs and the way we conceive of the body in pain, we can work towards developing an educational experience that promotes positive pain beliefs among medical students. In this way, rather than expecting chronic pain patients to be “difficult” or “overwhelming” to work with, medical students will be prepared to encounter chronic pain patients with the belief that such work is rewarding and meaningful. Students will also be encouraged to approach patients’ pain with the belief that it is legitimate and worthy of careful assessment and effective relief.

In conducting this research, I have found that there is much work to be done in developing pain curricula in undergraduate medical schools in Ontario. This work involves the inclusion of pain as an entry-to-practice competency requirement, as well as a re-organization of undergraduate curricula such that pain content is taught in pain-specific courses introduced early in the curriculum. In developing a pain curriculum, it will be essential to draw upon resources such as the IASP Interprofessional Pain Curriculum. This Interprofessional Curriculum takes a more balanced approach to pain education, and encourages medical programs to develop an interprofessional curriculum that emphasizes the importance of a multidisciplinary, biopsychosocial approach to pain. Finally, rather than take for granted that pain management should be approached through a biomedical model, curriculum planners should be explicit in the ethical commitments and ideological stances they adopt in developing pain content. These findings also suggest that curriculum planners should consider the success of palliative and end-of-life care curricula in taking a balanced, holistic, biopsychosocial approach to pain management. In drawing on these resources, there is the possibility of developing rigorous and balanced pain curricula that demonstrate the most current pain research and advances in pain management. Improving medical students’ pain education, in turn, opens the possibility of effecting real change in the lives of those who suffer from chronic pain.

Bibliography

- “About CanMEDS.” The Royal College of Physicians and Surgeons of Canada.
<http://www.royalcollege.ca/portal/page/portal/rc/canmeds/about>
- “The Accreditation of Canadian University CME/CPD Offices.” (1 January 2010). Committee on the Accreditation of Continuing Medical Education.
https://www.afmc.ca/sites/default/files/documents/en/Accreditation/FINAL_CACME_Standards_2010_ENGLISH.pdf
- Altman, C.G. (2010). *The Role of Resilience in Adjustment to Chronic Pain: A Preventive Model for At-Risk Populations*. PhD Thesis. The Adler School of Professional Psychology: Chicago.
- Armstrong, P. and Armstrong, H. (2010). *Wasting Away: the undermining of Canadian health care*. New York: Oxford University Press.
- Asbring, P. and Narvanen, A-L. (2002). “Women’s Experiences of Stigma in Relation to Chronic Fatigue Syndrome and Fibromyalgia.” *Qualitative Health Research* 12(2): 148-160
- Basbaum, A. and Jessell, T. (2000). “The perception of pain.” In E.R. Kandel, J.H. Schwartz, T.M. Jessell (Eds.), *Principles of Neural Science 4th Edition*. New York: McGraw-Hill.
- Baszanger, I. (1989). “Pain: Its Experience and Treatments.” *Social Science and Medicine* 29(3), 425-434
- “Becoming a Physician.” Health Force Ontario. www.healthforceontario.ca/en/Home/Students
- Beecher, H.K. (1959). *Measurement of subjective responses: quantitative effects of drugs*. New York: Oxford University Press.
- Belgrade, M.J. (2003). “Alternative and Complementary Therapies.” In T.S. Jensen, P.R. Wilson, A.S.C. Rice (Eds.) *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press.
- Brown, T.M (2010). “The Historical and Conceptual Foundations of the Rochester Biopsychosocial Model.” *UR Research at the University of Rochester: History Faculty Unpublished Papers and Lectures*. <http://hdl.handle.net/1802/2781>
- Butler, M. (May 16 2016). “Who is behind Canada’s opioid epidemic?” *The Council of Canadians*. <http://canadians.org/blog/who-behind-canadas-opioid-epidemic>
- Campbell, C.M. and Edwards, R.R. (2012). “Ethnic differences in pain and pain management.”

Pain Management 2(3): 219-30

Canadian Centre on Substance Abuse. (2015). "Prescription Opioids."

[http://www.ccsa.ca/Resource%20Library/CCSA-Canadian-Drug-Summary-Prescription Opioids-2015-en.pdf](http://www.ccsa.ca/Resource%20Library/CCSA-Canadian-Drug-Summary-Prescription-Opioids-2015-en.pdf)

Canadian Centre on Substance Abuse. (2012). "Addressing Prescription Drug Misuse in Canada: National Dialogue Summary Report." [http://www.ccsa.ca/Resource%20Library/2012 Prescription-Drug-Misuse-in-Canada%E2%80%93Summary-Report-en.pdf](http://www.ccsa.ca/Resource%20Library/2012-Prescription-Drug-Misuse-in-Canada%E2%80%93Summary-Report-en.pdf)

Canadian Pain Society. (June 2014). "Pain in Canada Fact Sheet." *The Canadian Pain Society* http://c.ymcdn.com/sites/www.canadianpainsociety.ca/resource/resmgr/Docs/pain_fact_sheet_en.pdf

Canadian Pain Society. (2010). "Brief for the Parliamentary Committee on Palliative and Compassionate Care." *Canadian Pain Strategy*.

Cano-Garcia, F.J., Rodriguez-Franco, L., and Lopez-Jimenez, A.M. (2013). "Locus of control patterns in headaches and chronic pain." *Pain Research and Management* 18(4): 48-54

Chapman, C.R. and Gavrin, J. (1999). "Suffering: the contributions of persistent pain." *The Lancet* 353: 2233-2237

Cheville, A., Caaceni, A., and Portney, R. (2000). "Pain: definition and assessment." In Massie, M.J. (Ed.). *Pain: What Psychiatrists Need to Know*. Washington: American Psychiatric Press.

Choiniere, M., Dion, D., Peng, P., Banner, R., Barton, P.M., Boulanger, A., Clark, A.J., Gordon, A.S., Guerriere, D.N., Guertin, M.C., Intrater, H.M., Lefort, S.M., Lynch, M.E., Moulin, D.E., Ong-Lam, M., Racine, M., Rashiq, S., Shir, Y., Taenzer, P. and Ware, M. (2010). "The Canadian STOP-PAIN Project Part 1: Who are the patients on the waitlists of multidisciplinary pain treatment facilities?" *Canadian Journal of Anesthesia* 57, 539-48
"Committee on Accreditation of Canadian Medical Schools (CACMS)." The Association of Faculties of Medicine of Canada. www.afmc.ca/accreditation/committee-accreditation-canadian-medical-schools-cacms

Cronje, R. and Fullan, A. (2003). "Evidence-based medicine: toward a new definition of 'rational' medicine." *health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine* 7(3): 353-369

Descartes, R. (1998). *Discourse on method and Meditations on First Philosophy*. (Trans. D.A.

- Cress). Indianapolis: Hackett Publishing.
- Dhalla, I.A., Persaud, N. and Juurlink, D.N. (2011). "Facing up to the prescription opioid crisis." *British Medical Journal* 343:d5142
- Dubos, R. (1968). *Man, medicine, and environment*. New York: New American Library.
- Durand Thomas, M., O'Connor, F.W., Albert, M.L., Boutain, D., and Brandt, P.A. (2001). "Case-Based Teaching and Learning Experiences." *Issues in Mental Health Nursing* 22(5), 517-531
- Eccleston, C., Williams, A., and Morley, S. (2003). "Cognitive-behavior therapy for chronic pain in adults." In Jensen, T.S., Wilson, P.R. and Rice, A.S.C. (eds). *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press.
- Engel, G.L. (1996). "From Biomedical to Biopsychosocial: II. A Personal Odyssey." *Families, Systems, & Health* 14(4), 434-449
- Engel, G.L. (1977). "The need for a new medical model: a challenge for biomedicine." *Science* 196(4286), 129-136
- Fillingim, R.B. (2000). "Sex, gender, and pain: Women and men really are different." *Current Review of Pain* 4(1): 24-30
- Filorama, M.A. (2007). "Improving goal setting and goal attainment in patients with chronic noncancer pain." *Pain Management Nursing* 8(2): 96-101
- Fishman, S.M., Young, H.M., Lucas Arwood, E., Chou, R., Herr, K., Murinson, B.B., Watt Watson, J., Carr, D.B., Gordon, D.B., Steven, B.J., Bakerjian, D., Ballantyne, J.C., Courtenay, M., Djukic, M., Koebner, I.J., Mongoven, J.M., Paice, J.A., Prasad, J.A., Singh, N., Sluka, K.A., St Marie, B., and Strassels, S.A. (2013). "Core Competencies for Pain Management: Results of an Interprofessional Consensus Summit." *Pain Medicine* 14: 971-981
- Fry, R.P.W., Crisp, A.H., and Beard, R.W. (1997). "Sociopsychological Factors in Women With Chronic Pelvic Pain With and Without Pelvic Venous Congestion." *Journal of Psychosomatic Research* 42(1): 71-85
- Gatchel, R.J. (2004). "Comorbidity of Chronic Pain and Mental Health Disorders: The Biopsychosocial Perspective." *American Psychologist* 59(8): 798-805
- Gatchel, R.J. (1999). "Perspectives on Pain: A Historical Overview." In R.J. Gatchel and D.C.

- Turk (Eds.) *Psychosocial Factors in Pain: Critical Perspectives*. New York: The Guilford Press, 7
- Gatchel, R.J. and Epker, J. (1999). "Psychosocial Predictors of Chronic Pain and Response to Treatment." In R.J. Gatchel and D.C. Turk (Eds.) *Psychosocial Factors in Pain: Critical Perspectives*. New York: The Guilford Press, 425
- Gatchel, R., Peng, Y.B., Peters, M.L., Fuchs, P.N., and Turk, D.C. (2007). "The Biopsychosocial Approach to Chronic Pain: Scientific Advances and Future Directions." *Psychological Bulletin* 133(4), 607
- Grace, V.M. and MacBride-Stewart, S. (2007). "'Women get this:' gendered meanings of chronic pelvic pain." In *Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine* 11(1): 47-67
- Green, C.R., Ndao-Brumblay, S.K., Nagrant, A.M., Baker, T.A., and Rothman, E. (2004). "Race, age, and gender influences among clusters of African American and white patients with chronic pain." *The Journal of Pain* 5(3): 171-182
- Hafferty, F.W. and Castellani, B. (2009). "The hidden curriculum: a theory of medical education." In C. Brosnan and B.S. Turner (eds.) *Handbook of the Sociology of Education*. New York: Routledge, 15-35
- Henry, J.L. (2008). "The need for knowledge translation in chronic pain." *Pain Research and Management* 13(6), 465-476
- Henry, J.L. (2001). "Report of the Canadian Consortium on Pain Mechanisms Diagnosis and Management: Defining the Research Agenda for Pain in Canada." *Canadian Consortium on Pain Mechanisms Diagnosis and Management*.
- Heshusius, L. (2009). *Inside chronic pain: an intimate and critical account*. Ithaca: Cornell University Press.
- Holroyd, K.A. and Lipchik, G.L. (1999). "Psychological Management of Recurrent Headache Disorders: Progress and Prospects." In R.J. Gatchel and D.C. Turk (Eds.) *Psychosocial Factors in Pain: Critical Perspectives*. New York: The Guilford Press.
- Humphreys, J., Cooper, B.A., and Miaskowski, C. (2011). "Occurrence, Characteristics, and Impact of Chronic Pain in Formerly Abused Women." *Violence Against Women* 17(10): 1327-1343
- Hunter, J., Watt-Watson, J., McGillion, M., Raman-Wils, L., Cockburn, L., Lax, L., Stinson, J.,

- Cameron, A., Dao, T., Pennefather, P., Schreiber, M., Librach, L., Kavanagh, T., Gordon, A., Cullen, N., Mock, D., and Salter, M.. (2008). "An interfaculty pain curriculum: Lessons learned from six years experience." *Pain* 140, 74-86
- International Association for the Study of Pain. (2012). "IASP Interprofessional Pain Curriculum Outline." *International Association for the Study of Pain*, <http://www.iasp-pain.org/Education/CurriculumDetail.aspx?ItemNumber=2057>
- Jackson, J.E. (2005). "Stigma, liminality, and chronic pain: Mind-body borderlands." *American Ethnologist* 32(3): 332-353
- Jacob, M.C and Kerns, R.D. (2001). "Assessment of the Psychosocial Context of the Experience of Chronic Pain." In Turk, D.C. and Melzack, R. (eds.) *Handbook of Pain Assessment* (2nd Edition). New York: The Guilford Press.
- "Junk the Term Narcotics—Call Them Opioids." (June 2012). *Practical Pain Management*, <http://www.practicalpainmanagement.com/treatments/pharmacological/opioids/junk-term-narcotics-call-them-opioids>
- Kalso, E., Edwards, J.E., Moore, R.A., and McQuay, H.J. (2004). "Opioids in chronic non cancer pain: systematic review of efficacy and safety." *Pain* 112(3): 372-80
- Kassebaum, G. and Baumann, B. (1965). "Dimensions of the sick role in chronic illness." *Journal of Health and Social Behavior* 6, 16-27
- Kavanagh, K.H. (2007) "Meaning in Suffering: A Patchwork Remembering." In N. Johnston and A. Scholler-Jaquis (Eds.), *Meaning in Suffering: Caring Practices in the Health Professions*. Wisconsin: University of Wisconsin Press, 7-59
- Kelly, A.V. (2009). *The Curriculum: Theory and Practice* (6th Edition). London: Sage, 13
- Kennett, D.J., O'Hagan, F.T. and Cezer, D. (2008). "Learned Resourcefulness and the Long Term Benefits of a Chronic Pain Management Program." *Journal of Mixed Methods Research* 2(4): 317-339
- Keogh, E., McCracken, L.M. and Eccleston, C. (2005). "Do men and women differ in their response to interdisciplinary chronic pain management?" *Pain* 114(1-2): 37-46
- Koenig, H.G. (2003) *Chronic Pain: Biomedical and Spiritual Approaches*. New York: The Haworth Pastoral Press.
- Kotarba, J. (1983). *Chronic Pain: Its Social Dimensions*. London: Sage Publications.
- Krippendorff, K. (2004). *Content analysis: an introduction to its methodology*. Thousand Oaks,

California: Sage, 18

Lampe, A., Solder, E., Ennemoser, A., Schubert, C., Rumpold, G. and Sollner, W. (2000).

“Chronic pelvic pain and previous sexual abuse.” *Obstetrics & Gynecology* 96(6): 929-33

Leach Scully, J. (2004). “What is a disease? Disease, disability and their definitions.” *EMBO reports* 5(7): 650-653

Lee, M., Silverman, S., Hansen, H., Patel, V., and Manchikanti, L. (2011). “A Comprehensive Review of Opioid-Induced Hyperalgesia.” *Pain Physician* 14: 145-161

Lennon, M.C., Link, B.G., Marbach, J.J., and Dohrenwend, B.P. (1989). “The Stigma of Chronic Facial Pain and Its Impact on Social Relationships.” *Social Problems* 36(2): 117-134

Liebeskind, J.C. (1991). “Pain *can* kill.” *Pain* 44, 3-4

Linton, S.J. (1999). “Prevention with Special Reference to Chronic Musculoskeletal Disorders.” In R.J. Gatchel and D.C. Turk (Eds.) *Psychosocial Factors in Pain: Critical Perspectives*. New York: The Guilford Press.

McGrath, P., Hetherington, R., and Finley, G.A. (2003). “Chronic pain in children.” In T.S. Jensen, P.R. Wilson, and A.S.C. Rice (Eds.), *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press, 644

Mehta, A. and Chan, L.S. (2008). “Understanding the Concept of ‘Total Pain.’” *Journal of Hospice and Palliative Nursing* 10(1): 26-32

Melzack, R. (2004). “Evolution of the Neuromatrix Theory of Pain. The Prithvi Raj Lecture: Presented at the Third World Congress of World Institute of Pain, Barcelona 2004.” *Pain Practice* 5(2): 85-94

Melzack, R. (1996). “Gate control theory: On the evolution of pain concepts.” *Pain Forum* 5(2): 126-138

Melzack, R. and Wall, P.D. (1996). *The challenge of pain*. Harmondsworth: Penguin.

Melzack, R., Wall, P.D., and Ty, T.C. (1982). “Acute Pain in an Emergency Clinic: Latency of Onset and Descriptor Patterns Related to Different Injuries.” *Pain* 14, 33-43

Merskey, H. and Bogduk, N. (2011). *Classification of Chronic Pain: Descriptions of Chronic Pain Syndromes and Definitions of Pain Terms (Second Edition)*. Seattle: IASP Press.

Mezei, L. and Murinson, B.B. (2011). “Pain Education in North American Medical Schools.” *The Journal of Pain* 12(12): 1199-1208

Miotto, K. and Ling, W. (1996). “Diagnosing Addictive Disease in Chronic Pain Patients.”

- Psychosomatics* 37(3): 223-235
- Moayedi, M. and Davis, K.D. (2012). "Theories of pain: from specificity to gate control." *Journal of Neurophysiology* 109(1), 5-12
- Morley-Forster, P.K., Pergolizzi, J.V., Taylor Jr., R., Axford-Gatley, R.A., and Sellers, E.M. (2013). "Mitigating the risk of opioid abuse through a balanced undergraduate pain medicine curriculum." *Journal of Pain Research* 6, 791-801
- Morris, D.B. (2003). "The challenges of pain and suffering." In T.S. Jensen, P.R. Wilson, and A.S.C. Rice (Eds.), *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press.
- Morse, D.S., Johnson, K.R. and Cohen, J. (2013). *The Evolution and Legacy of the Engel and Romano Work in Biopsychosocial Medicine*. Rochester: Meliora Press.
- Moulin, D.E., Clark, A.J., Speechley, M., and Morley-Forster, P.K. (2002). "Chronic pain in Canada—Prevalence, treatment, impact and the role of opioid analgesia." In *Pain Research and Management* 7(4): 179-184
- Murinson, B.B., Agarwal, A.K. and Haythornthwaite, J.A. (2008). "Cognitive expertise, emotional development, and reflective capacity: Clinical skills for improved pain care." *The Journal of Pain* 9, 975-983
- Niemi-Murola, L., Pirkko, H., Pyorala, E., Eija, K., and Reino, P. (2006). "Training medical students to manage a chronic pain patient: both knowledge and communication skills are needed." *European Journal of Pain* 10, 167-170
- "Objectives for the Qualifying Examination: Third Edition." The Medical Council of Canada. www.mcc.ca/wp-content/uploads/qualifying-examination-objectives.pdf
- Oguamanam, C. (2006). "Biomedical Orthodoxy and Complementary and Alternative Medicine: Ethical Challenges of Integrating Medical Cultures." *Journal of Alternative and Complementary Medicine* 12(5): 577-581
- Ogura, T. and Egan, T.D. (2013). "Opioid Agonists and Antagonists." In H.C. Hemmings, T.D. Egan (Eds.), *Pharmacology and Physiology for Anesthesia: Foundations and Clinical Application*. Philadelphia: Saunders.
- Pacheco, J.A. (2012). "Curriculum Studies: What is The Field Today?" *Journal of the American Association for the Advancement of Curriculum Studies* 8, 1-18

- Persaud, N. (2013). "Questionable content of an industry-supported medical school lecture series: a case study." *Journal of Medical Ethics*, 2
- Poyhia, R., Niemi-Murola, L., and Kalso, E. (2005). "The outcome of pain related undergraduate teaching in Finnish medical faculties." *Pain* 115, 234-237
- Pridmore, S. (2002). *Managing chronic pain: a biopsychosocial approach*. London: Martin Dunitz.
- Richardson, J.C. (2005). "Establishing the (extra)ordinary in chronic widespread pain." *health: An Interdisciplinary Journal for the Study of Health, Illness and Medicine* 9(1): 31-48
- Richardson, J.C., Ong, B.N., and Sim, J. (2007). "Experiencing chronic widespread pain in a family context: giving and receiving practical and emotional support." *Sociology of Health and Illness* 29(3): 347-365
- Roberto, K.A. and Reynolds, S.G. (2002). "Older Women's Experiences with Chronic Pain: Daily Challenges and Self-Care Practices." *Journal of Women & Aging* 14(3/4), 5-23
- Robinson, K., Kennedy, N. and Harmon, D. (2013). "Constructing the experience of chronic pain through discourse." *Scandinavian Journal of Occupational Therapy* 20(2): 93-100
- Roy, R. (2008). *Psychosocial Interventions for Chronic Pain: In Search of Evidence*. New York: Springer, 19-28
- Rustoen, T., Wahl, A.K., Hanestad, B.R., Lerdal, A., Paul, S. and Miaskowski, C. (2005). "Age and the experience of chronic pain: differences in health and quality of life among younger, middle-aged, and older adults." *Clinical Journal of Pain* 21(6): 513-23
- Salas, A.A., Anderson, M.B., LaCourse, L., Allen, R., Candler, C.S., Cameron, T. and Lafferty, D. (2003). "CurrMIT: a tool for managing medical school curricula." *Academic Medicine* 78(3): 275-9
- Sandroni, P., Dotson, R. and Low, P.A. (2003). "Complex regional pain syndromes." In T.S. Jensen, P.R. Wilson, and A.S.C. Rice (Eds.), *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press
- Scarry, E. (1985). *The Body in Pain: The Making and Unmaking of the World*. Oxford: Oxford University Press.
- Shah, S. and Diwan, S. (2010). "Methadone: Does Stigma Play a Role as a Barrier to Treatment of Chronic Pain?" *Pain Physician* 13, 289-293
- Shembalkar, P. and Anand, P. (2003). "Peripheral neuropathies." In T.S. Jensen, P.R. Wilson,

- and A.S.C. Rice (Eds.), *Clinical Pain Management: Chronic Pain*. New York: Oxford University Press.
- Sierles, F.S., Brodkey, A.C., Cleary, L.M., McCurdy, F.A., Mintz, M., Frank, J., Lynn, D.J., Chao, J., Morgenstern, B.Z., Shore, W., and Woodard, J.L. (2005). "Medical students' exposure to and attitudes about drug company interactions: a national survey." *The Journal of the American Medical Association* 7;294(9): 1034-42
- Siddall, P.J. and Cousins, M. (2004). "Persistent pain as a disease entity: implications for clinical management." *Anesthesia & Analgesia* 99(2): 510-20
- Silverman, S. (2009). "Opioid Induced Hyperalgesia: Clinical Implications for the Pain Practitioner." *Pain Physician* 12: 679-684
- Sit, R.W., Yip, B.H., Chan, D.C. and Wong, S.Y. (2015). "Primary care physicians' attitudes and beliefs towards chronic low back pain: an Asian study." *PLoS One* 10(1): e0117521
- Smith, G. (1990). "Political Activist as Ethnographer." *Social Problems* 37(4), 633
- Sorge, R.E., Mapplebeck, J.C.S., Rosen, S., Beggs, S., Taves, S., Alexander, J.K., Martin, L.J., Austin, J-E., Sotocinal, S.G., Chen, D., Yang, M., Shi, X.Q., Huang, H., Pilon, N.J., Bilan, P.J., Tu, Y., Klip, A., Ji, R-R., Zhang, J., Salter, M.W., Mogil, J.S. (2015). "Different immune cells mediate mechanical pain hypersensitivity in male and female mice." *Nature Neuroscience* 18(8): 1081-3
- Tetrault, J.M. and Butner, J.L. (2015). "Non-Medical Prescription Opioid Use and Prescription Opioid Use Disorder: A Review." *Yale Journal of Biology and Medicine* 88(3), 227-233
- Thomson, P. (2006). "Lessons of Pain: A Symptom Stretched Across All Specialties." *The New Physician* 55(8)
- Todd, K.H., Ducharme, J., et al. (2007). "Pain in the Emergency Department: Results of the Pain and Emergency Medicine Initiative (PEMI) Multicenter Study." In *The Journal of Pain* 8(6), 460-466
- Tryon, J. and Tucker, E. (June 11 2013). "Patient safety may have been put at risk by U of T pain lectures: doctor." *Global News*. <http://globalnews.ca/news/633687/patient-safety-may-have-been-put-at-risk-by-u-of-t-pain-lectures-doctor/>
- Turk, D.C. and Melzack, R. (2001). *Handbook of pain assessment (2nd Edition)*. New York: Guilford Press.
- Turk, D.C. and Melzack, R. (2001). "The Measurement of Pain and the Assessment of People

- Experiencing Pain.” In Turk, D.C. and Melzack, R.M. (eds.) *Handbook of Pain Assessment (2nd Edition)*. New York: The Guilford Press.
- Ury, W.A., Rahn, M., Tolentino, V., Pignotti, M.G., Yoon, J., McKegney, P. and Sulmasy, D.P. (2002). “Can a Pain Management and Palliative Care Curriculum Improve the Opioid Prescribing Practices of Medical Residents?” *Journal of General Internal Medicine* 17(8): 625-631
- Walker L.S., Garber, J., and Greene, J.W. (1994). “Somatic complaints in pediatric patients: a prospective study of the role of negative life events, child social and academic competence, and parental somatic symptoms.” *Journal of Consulting and Clinical Psychology* 62(6), 1213-21
- Watson, C.P.N., Watt-Watson, J., and Chipman, M. (2010). “The long-term safety and efficacy of opioids: A survey of 84 selected patients with intractable chronic noncancer pain.” *Pain Research and Management* 15(4), 213
- Watt-Watson, J., McGillion, M., Hunter, J., Choiniere, M., Clark, A.J., Dewar, A., Johnston, C., Lynch, M., Morley-Forster, P., Moulin, D., Thie, N., von Baeyer, C.L., and Webber, K (2009). “A survey of prelicensure pain curricula in health science faculties in Canadian universities.” *Pain Research and Management* 14(6), 441-2
- Watt-Watson, J., Peter, E., Clark, A.J., Dewar, A., Hadjistavropoulos, T., Morley-Forster, P., O’Leary, C., Raman-Wilms, L., Unruh, A., Webber, K., and Campbell-Yeo, M. (2013). “The ethics of Canadian entry-to-practice pain competencies: How are we doing?” *Pain Research and Management* 18(1), 25-32
- Watt-Watson, J., Peter, E., Hayward, M., and Carlsson, L. (2008). “Entry to practice pain competencies: Survey of requirements for health science students.” *Pain Research and Management* 13, 111-53
- Watt-Watson, J. and Siddall, P.J. (2013). “Improving Pain Practices Through Core Competencies.” *Pain Medicine* 14: 966-967
- Waugh, O.C., Byrne, D.G. and Nicholas, M.K. (2014). “Internalized Stigma in People Living with Chronic Pain.” *The Journal of Pain* 15(5): 550.e1-550.e10
- Weeks, C. (March 10 2016). “College of Family Physicians rejects call for mandatory course on safe opioid prescribing.” *The Globe and Mail*.
<http://www.theglobeandmail.com/life/health-and-fitness/health/college-of-family->

- physicians-rejects-call-for-mandatory-course-on-safe-opioid-prescribing/article29141141/
- Weinstein, S.M., Laux, L.F., Thornby, J.I., Lorimer, R.J., Hill, C.S., Thorpe, D.M., and Merrill, J.M. (2000). "Physicians' attitudes toward pain and the use of opioid analgesics: results of a survey from the Texas Cancer Pain Initiative." *Southern Medical Journal* 93(5), 479-487
- Werner, A. and Malterud, K. (2003). "It is hard work behaving as a credible patient: encounters between women with chronic pain and their doctors." *Social Science & Medicine* 57, 1409-1419
- White, P. (2005). *Biopsychosocial Medicine: an integrated approach to understanding illness*. London: Oxford University Press.
- Wiesenfield-Hallin, Z. (2005). "Sex Differences in Pain Perception." *Gender Medicine* 2(3): 137-145
- Willis, E. (1983). *Medical dominance: the division of labour in Australian health care*. Sydney: Allen & Unwin.
- Wilson, J.F., Brockopp, G.W., Kryst, S., Steger, H. and Witt, W.O. (1992). "Medical students' attitudes toward pain before and after a brief course on pain." *Pain* 50(1992): 251-256
- Wittert, G.A. and Nelson, A.J. (2009). "Medical education: Revolution, devolution and evolution in curriculum philosophy and design." *Medical Journal of Australia* 191, 35-7
- Wittink, H., Cohen, L.J., and Hoskins Michel, T. (2002). "Pain Rehabilitation: Physical Therapy Treatment." In H. Wittink and T. Hoskins Michel (Eds.) *Chronic Pain Management for Physical Therapists (2nd Edition)*. Boston: Butterworth-Heinemann, 127-159
- Woolf, C.J. (2010). "What is this thing called pain?" *Journal of Clinical Investigation* 120(11): 3742-3744
- World Health Organization. (2016). "WHO Definition of Palliative Care."
<http://www.who.int/cancer/palliative/definition/en/>